

COMMERCIAL CAR JOURNAL

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EDITORIAL CONTENTS

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Feature Articles

Service Pointers On Vacuum Power Brakes.....	14
What Floods Did to Fleets	16
Fleetmen Uncover Spot Painting Methods.....	18
Safety Hinges On the Grub Drivers Grab.....	21
It's a Cinch to Read a "Mike"	22
Truck Service Specifications.....	23
A Shipper Gives Rates the Third Degree.....	29
The Album	30
The Effects of Legislation On Truck Design.....	32

Descriptions

Studebaker Has Hill-Holder for Trucks.....	34
Shop Dynamometer	34
¾-Ton Diamond T Lists at \$525.....	35
Mallory Ignition System Has Hot Spark.....	38
Karymore Unit for Trucks.....	42

Departments

The Overload	11
Ears to the Ground	13
New Products On Parade	36
New Truck Registrations by Makes by Months....	38
News	40
Commercial Car Journal Truck Specifications.....	44
Free Money Makers for You	85
Advertisers' Index	100

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COMMERCIAL CAR JOURNAL
JULY, 1936

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The PROOF is



TESTS LIKE THIS quickly show why Marfak stays in bearings so much longer than ordinary grease lubricants—why the Maintenance Awards for the past six years have gone to fleets using Marfak for chassis lubrication.

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One of the largest fleet operators in Virginia packs wheel bearings with Marfak, and does not remove hub-caps even for inspection until vehicles have traveled 25,000 miles.

LARGEST OPERATOR IN U. S. of both buses and taxicabs, uses Marfak exclusively for chassis lubrication.

TEXACO *Truck*

COMMERCIAL CAR JOURNAL
JULY, 1936

The Overload

Overloaded Editors

HAVING had a couple of months to recover from the rigors of the special issue in April the editors of COMMERCIAL CAR JOURNAL plunged into another gigantic job with their usual zest, and heartless wretches that they are, they drew a lot of unsuspecting factory men into the same job from which there was no retreat. The result is those neatly tabulated columns on page 24 and which give you complete tune-up specifications and lubricant capacities of almost all current truck models and many of the older models.

Behind those neat and informative pages is a lot of story and sweat. True, a tune-up table was published in this magazine last year but the table in this issue contains many more truck models and much more information on each model. To get the completeness desired in a table of this kind additional help was required to supplement the efforts of the regular staff and the volume of correspondence grew until we felt like a sweepstakes winner must feel when the direct mail experts start the campaign to separate him from the recently acquired dough.

Statistic Stevedores

SELFISH as the payroll help are, they are willing to stand at attention and watch medals pinned on the broad breasts of the various individuals from the truck factories who heaped the information on editorial desks. Knowing

full well what had to be done with the information after it arrived, the editorial staff also knows that the factory correspondents had done a lot of work on their own account to get it there. All of this to make your fleet operate more smoothly.

River Stay Away . . .

FLOODS come only once in a while but the COMMERCIAL CAR JOURNAL correspondent in Pittsburgh was willing to get mud on his boots to find out how fleets go about digging themselves out. Keep the article high and dry and you can refer to it when a flood hits your fleet.

To Complete the Course

IF after reading the instructions for



Wherever this Chevrolet package delivery truck goes for Marshall Field in Chicago, an A.A.A. observer is sure to tag along. He remains with the truck throughout the day, keeps an exact record of the time of each delivery, mileage between stops, etc. He also holds the key to the locked gas tank. Crankcase, transmission and rear axle are sealed. There are 12 such units in as many cities where 30-day performance tests are being made by Chevrolet

reading micrometers on page 17 you are interested in receiving more information about "mikes," such as methods of using them and adjustments, etc., you can get this information by checking "A" on the coupon. Supplementary information of this kind should be in fleet files.

The Worm Turns

NEW YORK Times Headline: "T. F. Manville, Jr., Sued. Truck Driver Charges Abusive Language and Asks \$17,000."

Book Review

WITH that rousing feeling that comes with being able to recommend something, P. M. Heldt's High Speed Diesel Engines, second edition, is held up for your consideration. In orderly fashion Mr. Heldt discusses the conception, ap-



A. W. Way has a way of saving money on the Pacific coast. Way acquired this Kleiber tractor equipped with a Buda diesel to haul the refrigerated "semi" on trips of 300 miles almost every day. The trip is made in about 14 hours. Average load is 17 tons. Eighty to 100 gal. of fuel oil used on the round trip cost between \$4 and \$5. Formerly 250 gal. of gas were used on the same trip at a cost of about \$37.50. Where there's a will, there's Way!

The Overload

plication and design for this type of engine without borrowing at great length from general discussion of the various engineering societies which is hardly relevant. This in itself represents a departure from other efforts in this direction.

The chapters on design are especially good as a result of Mr. Heldt's thorough familiarity with the subject and his ability to describe existing design and interpret the reasoning behind it. Illustrations have been chosen liberally but wisely and they have been inserted where it is easy to refer to them. Many of them appear to be original. Closing the 434 pages of the book is a lengthy chapter on operation and maintenance which is interesting to fleet men and service men. Published by P. M. Heldt, Nyack, N. Y.

Trucks and Taxes

HAVING contemplated Mayor McNair's single tax ideas with only an academic interest while His Honor was occupied with some atrocious violin playing and low comedy on various radio programs, the city Fathers of Pittsburgh are now financially interested in sticking another tax on trucks. The latest effort is an annual tax on each truck, just for being a truck, one supposes.

Book on Tailoring

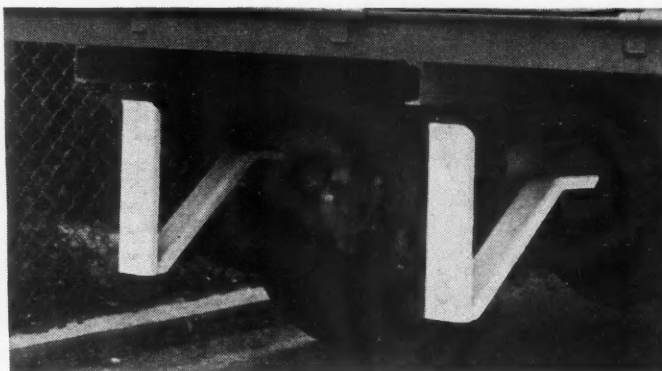
"FITTING the Truck to the Job" is the name of a volume from the pen of Charles W. Kynoch, of the Dodge Division of the Chrysler Corp. The purpose of the book is to help Dodge Dealers and operators select the right truck for the job at hand and it is designed to do just that. But in doing that Mr. Kynoch gives a lot of sound informa-



With the Texas Centennial Exposition at Dallas in full swing, the Harris & Co. department store conceived the idea of a covered wagon prairie schooner (only this time it's a Dodge truck in disguise) for a little centennial atmosphere. Drivers wear blue jeans, plaid shirts and 10-gal. hats. Hy, yi, yippyl



This Huber and Huber Motor Express dock in Louisville, Ky., is 360 ft. long and 60 ft. wide and is as modern as they come in motor truck terminals. Two eight-foot docks handle 40 trucks at once. A tire room, parts room, garage, rest rooms for drivers, and locker room are all under its roof. In all, Huber and Huber have 100 trucks rolling over the highways through the south, middlewest and other points



In April we asked for details of a rear bumper to prevent cars telescoping into rear-ends. GMC offers this perfect example. The V-shaped brackets are mounted to the frame 6 in. from the rear with a ground clearance of 12 to 15 in. Any other safety suggestions?

tion that is not only Dodge information, it is sound truck information.

Fore . . .

PERHAPS it's from keeping truck records and a chance to observe how records brought the cost down. J. F. Winchester, the Standard Oil of New Jersey fleet operator, has figured out a box score as a means of keeping golf records. The score, same as truck records, provides history upon which to base action for the future. The system does not pretend to improve your game by merely keeping score. Look as this department did, it could not find any way to prevent a hook or a slice. The "pro" will do that.

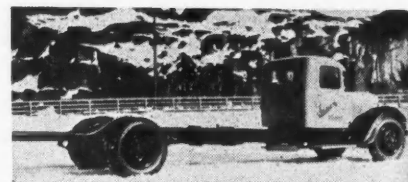
Circulating Library

COMMERCIAL CAR JOURNAL now values among its treasured possessions six copies of a "Study of Transporting Less Than Truck Load Shipments by Motor Vehicle Between Centers of Population in the State of California." The study is by the Engineering Division, Transportation Department of the California Railroad Commission. Knowing full well that most for-hire operators will want to read this treatise this department was placed in a dilemma. CCJ's total is six copies and it is very doubtful if the State of California would go for the idea of supplying these booklets to various and sundry. Jumping

into the emergency with customary aplomb this department is going to make these six copies do the work of many. This is the plan: The first six operators who write for a copy will receive a copy from this office with the understanding that they will forward the copy to another operator upon instruction from COMMERCIAL CAR JOURNAL. Then the process will be repeated. If our bookkeeping is good you will all get a chance despite the slender stock. That is what is known as fast turnover. Address the editor

Job Finds Man

THE job mentioned in these columns in the May issue has found its man. The owner of the fleet advises that from the 300 applicants who responded to the May paragraph, one was selected and the 85 trucks are in good hands.



The Hercules diesel in this Finnish-made truck had a tough voyage in its trip across the ocean—and made part of the sea trip in another truck. It happened when the Baltic sea froze and the boat was caught in the ice. A truck drove out to the ship and, well, here is the engine all ready to go in spite of its frozen reception

To the GROUND

Fleet Favorite

With its usual adroitness in keeping ahead of the news, this department dispatches operatives in many directions and has been rewarded by the composite report that a number of large fleet operators are getting together for the purpose of determining what the specifications of a fleet passenger car should be. If they can agree on the specifications and reach a figure representing their volume, they may enter negotiations in the matter of having cars built on contract. The complaint on the cars they buy now is too much style, too much power, too many gadgets and not enough economy.

Governor Geste

Two of our spies arrived at headquarters simultaneously. Each had a breathless report concerning a new governor. From the fact that one of the governors is to restrict engine R.P.M. and the other to restrict only M.P.H. the chief spy was able to determine that the two had not come upon the same information, so the report should be that two new governors will probably make an appearance soon.

Diesel Departure

Even though it is protected by high walls the news has leaked into trained ears that an X type Diesel engine is getting a thorough workout and it is performing so well that the word "amazing" is being used in connection with the test. If the test continues to amaze, the engine will be mounted in the rear of a 1938 vehicle which you can buy.

Hijacker Handles

New cab door handles are being made available that fit in a shallow recess. These handles provide a hand grip only after they have been released by pressing a button. When the doors are locked it is impossible to release the handle without a key. The reporter who covers crime for this department thinks that they have value in preventing theft and hijacking.

Patent Paradise

This rumor is just the faintest whisper

but this department has not missed it. Without evidence to support it this department hazards the guess that before long a large holding company will be formed composed of manufacturing subsidiaries. The purpose will be to provide outlets for worthwhile patents that have not found a favorable market through existing channels.

Tank Tabloid

Speaking of patents, a patented lightweight tank of exceptional strength is the subject of negotiation between the holder of the patent and a manufacturer of tanks. If these conversations come to a successful conclusion you should soon get the details on more gasoline and less total weight.

Delivery Design

Piecing scraps of information together and placing these gingerly gathered morsels so that they take on a meaning is no small part of this department's labors. However, it all seems worth while when we get a translation as sensational as this one. A light delivery truck with a V8 engine of considerably less than 200 cu. in. and very good performance as a result of high engine speeds. If we have done justice to our dispatches this creation should appear before the year is out.

Signal for Sale

Without stirring from its lair this department lured an inventor into its trap. The inventor, one Norman Bender, confessed to having patents on either an electrically operated pendulum or a pendulum operated by an air motor for making stop and directional signals blink. The demonstrator that Mr. Bender showed us worked very nicely. Mr. Bender indicated that he would gladly exchange ownership of the patent for a modest fee.

Metering Mention

A former university researcher has a carburetor which is supposed to do much better by the mileage records than the carburetors that are used as standard equipment now as a result of his many years' academic labors. Our expert wire tapper reports that if the patent holder is as good



The Kinnear steel rolling doors are finding favor with fleets. This type of door requires a minimum of space, is easily operated, can be rolled out of the way or locked securely. It rolls into fixed brackets at the roof of the body

at conducting negotiations as he is at conducting research activities, the carburetor will soon be under a hood.

Camel-Backs Coming

From all fronts come reports that camel-backs are becoming more important in the truck industry. The reasons for this are presented on page 32 in compact form. Evidence of this in part is the fact that four new Schacht models are camel-backs, covering the 2½ to 5½ ton range. Within a short time more camel-backs will invade the light truck class.

Four-wheel Foray

Our Colorado operative who has been dormant for many months suddenly comes to life with the terse dispatch that J. C. Jarrett demonstrated a new four wheel drive truck which did some convincing tricks. The new truck incorporates the patented front axle which was described in CCJ in the May, 1934, issue.

FREE

(Check and mail to the Editor, Commercial Car Journal, Philadelphia, Pa.)

- ☐ A—More Details on Micrometers and how to use them
- ☐ B—Handy Data Book for Mechanics
- ☐ C—Manual for Linderman Brakes
- ☐ D—Paint refinishing chart
- ☐ E—Service bulletin supplementing Greyrock Commercial Transportation Recommendation Guide
- ☐ F—1936 Operators' Tire Handbook

Name

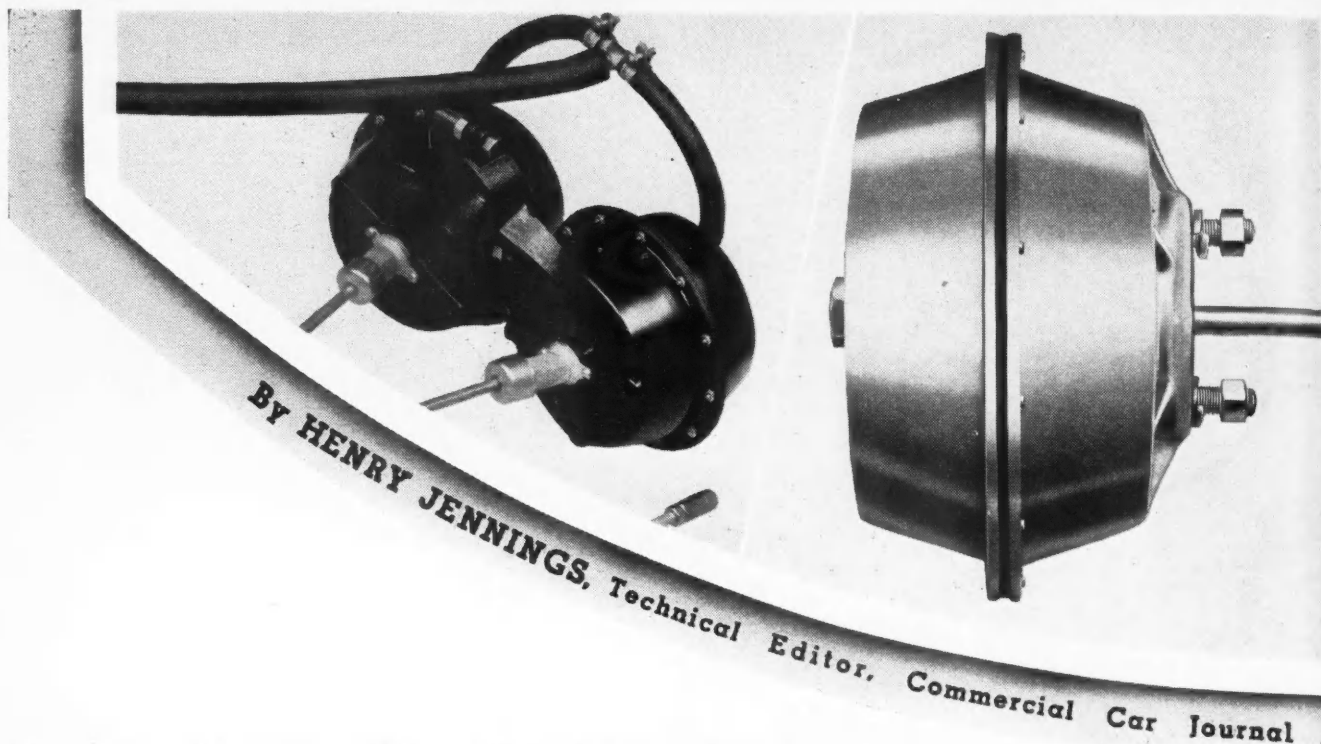
Title

Firm Name

Address

City

No. Trucks Operated . . . No. Cars . . .



Service Pointers on **VACUUM** *Power* **BRAKES**

Veteran Mechanics Who Know Their Brakes May Find the Step by Step Procedure Given Here Tedious. The Fleetman to Whom Vacuum Power Brakes Are New Will Find it Orderly and Complete, and With Use He Can Work Out His Own Short Cuts

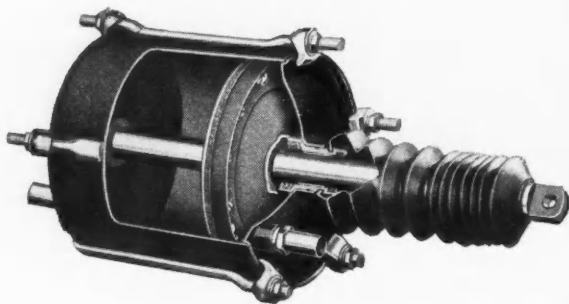
A VACUUM power brake unit consists of an operating valve, a power cylinder, a check valve, lines, and in some cases, a reserve tank. The power cylinder does the actual work of helping the driver apply the brakes and it is controlled by the operating valve which is actuated by the brake pedal. The purpose of the check valve is to maintain a maximum vacuum in the unit so that it does not vary with the engine speed. The lines are, of course, to carry the vacuum from the engine manifold through the power brake system, and the reserve tank is used when the engine vacuum is insufficient to handle repeated brake applications.

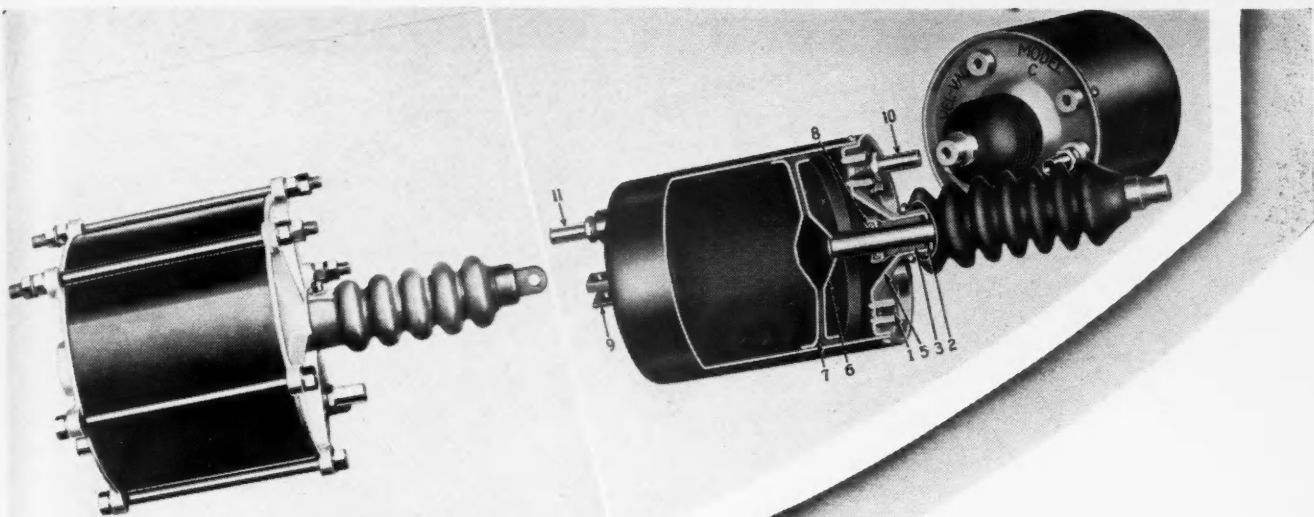
Two types of construction are used

on the power cylinders. One is the piston type and the other is the diaphragm type. Either type may be used in an air suspended system or a vacuum suspended system. In the air suspended system there is atmospheric pressure on both sides of the piston or diaphragm, and when the valve opens the atmospheric pressure is replaced by vacuum on one side of the piston. The

resulting movement applies the brakes. In the vacuum suspended system there is a vacuum on both sides of the piston and when atmospheric pressure is admitted to one side of the piston, by depressing the brake pedal, the piston is caused to move to the end where the vacuum still exists. This movement assists in applying the brake.

ABOUT the only thing that can happen to a vacuum power brake system once it has been installed correctly is that some part of the system can spring a leak. The piston-type power cylinders can stick from either corrosion or freezing and the rubber in the diaphragm type can deteriorate rapidly from being mounted too close to the exhaust pipe, but these things seldom happen. There is no excuse for their happening because they can be pre-





Left to right—Berg Bros. unit of the diaphragm type. Lathan-Bessler power cylinder, also of the diaphragm type. Bendix cylinder and Vel-Vac cylinders both of the piston type. Left—Doubling up on the tests by using two vacuum gages. Bottom of facing page—Midland Steel power cylinder of the piston type



What is a Vacuum Power Brake?

A VACUUM power brake is a device for increasing the severity of brake applications and is used with both mechanical brake systems and hydraulic brake systems. Essentially a vacuum power brake is a "strong leg" which enables the driver to apply the brakes with more force than he could when depending upon his strength alone. The device obtains its power from the vacuum created by the engine through a connection with the intake manifold.

The installation of a vacuum power brake does not involve any change in the principle or operation of the existing brake system. It is not a remedy for faulty brake adjustment.

The use of vacuum power brakes has become necessary as a result of increased speeds and loads.

and render the brake unit inactive. They can best be located by using a vacuum gage to check through the entire system. However, for an emergency test it is possible to determine if the unit is working by depressing the brake pedal slightly with the engine shut off. With the pedal slightly depressed, start the engine. The brake pedal should travel downward away from the foot if the vacuum brake is operating. The brake can pass this test and still not be operating satisfactorily for normal use.

To locate the trouble in an air suspended or single line unit:

(TURN TO PAGE 44, PLEASE)

vented by a minimum amount of preventive maintenance. In extremely cold climates the addition of 2 oz. of Prestone on each side of the piston will prevent freezing. Rusting and sticking can be prevented by lubricating the piston with SAE 20 engine oil every 3000 miles to 5000 miles or every four to six months. One ounce of oil inserted through the pipe plug provided

for that purpose if there is one or through the hose connection on the manifold end of the cylinder is sufficient for small cylinders. Two ounces are required for the larger sizes.

THE only problem in connection with maintaining vacuum power brakes is locating leaks when they occur. The leaks, of course, destroy the vacuum



FLOODS of 30 to 35 ft. occur every spring in Western Pennsylvania and so, when the weatherman insisted this flood would not go over 36 ft., Pittsburgh, Pa., nonchalantly prepared to get wet up to the hubs. But while a knot in the rope caused the weatherman's gage to stick, and he kept insisting that the water flood level was not over 36 ft., Old Man River kept sneaking up all through the night. . . .

And when morning dawned . . . the flood was away above all former records—at 46 ft. And what a lot of wetting 10 ft. extra does!

We must remember that flood water is seldom clean water, and contains everything from houses to huge gasoline storage tanks. Opinions differ as to the kind of mud. Some mechanics said it was soft, comparatively harm-

WHAT *Floods* Did to FLEETS

When Terra Firma Went Wetta Equipment Took It in the Necka

less muck. Other mechanics said that it contained a fair percentage of gritty sand. Possibly the sand was found in the trucks swept over by the swifter currents, while trucks submerged in garages got the lighter muck.

In one garage, the floor level was at 38 ft. and the operator in charge thought that even if the flood did reach a record breaking level, there would still be a reserve of a couple of feet above the floor level. But when the water rose over the garage floor—and still kept on rising—there was then 4 ft. of water on the streets and it was too late to get the trucks out!

IN ANOTHER instance, an armored money truck was parked at a place

from which it could have been driven to safety. But the driver would have had to swim to reach it and, as the current was swift and dangerous, the superintendent told the driver not to risk his life. That particular truck cost \$218.28 to put back into service, but the company considered it a wise investment in safety.

Cost of repairs, due to flood, varied from \$2.80 for 2 hours' time to "wash and dismantle" a passenger car, which was then traded in on a new car, up to \$611.26 for a 1½ ton electric unit, which had to have the tower removed so that the electric motors could be sent to Westinghouse for drying out. The power batteries on this unit were found to be all right after cleaning.



Opposite page—What fleet shops did to clean automotive parts of the muck and mud when trucks were trapped by floods in Pittsburgh, Pa., is told in this article. Above—This gives an idea of what Sunbury fleets had to contend with



WE wondered about the effect of floods on fleets. What were the shopmen's problems and how did they lick them after trucks trapped by recent floods in Pennsylvania had been salvaged and drydocked? In order to get an answer to this question *Commercial Car Journal* had a representative call on truck fleets in the flood area. Here is the resulting story. It is not only interesting but instructive. Fleetmen will find it valuable reading because it may happen to you, too!

Most of this \$611.26 was due to "equipment" mounted on the truck.

Taking 11 vehicles on which exact costs were obtained, there was a total cost of \$1,644.99, or approximately \$150 per vehicle figured on a labor cost of \$1.40. When trucks were disassembled, it was logical to replace some parts and make some repairs not actually caused by the flood. Actual flood costs would be about 20 per cent less than those given.

When considering the manner in

which the repairs were made, it must be remembered that many of the utilities trucks carried special equipment that was needed far more than ever before to cope with the "emergency conditions" caused by the flood. For instance, office buildings were flooded and without light, heat or telephones. The loss in employees' wages, business orders, etc., of a "closed" office building was so great that even minutes were precious. Consequently, trucks carrying winches and other needed equipment were wisely rushed back into service without wasting too much time in washing out brakes, axles and other parts where any grit would simply cause a little extra wear.

One large oil refining company had several "empty" tank trucks caught by the flood. The empty tanks acted as huge floats so that these trucks, even if not 99 per cent pure, floated around like soap in a tub. Owing to the "float-distribution," only the rear wheels were floated off the ground, and the front wheels remained on terra-wetta.

When the flood subsided, the rear wheels of one truck came down astraddle the hood of another truck, while the rear axle of still another truck came down on a cab, like Noah's ark on Mount Ratatat. With no sky-hooks or water wings available, it was quite a job to bring these trucks down to earth again.

ONE contractor had 22 large trucks submerged for from one to three days. But fortunately none of them were

new and engines were well broken in. As the water entered the breather pipes, the oil was floated off on top of the water. Crankcases were drained and flushed. Subsequent use indicates that the engines suffered but little damage.

Another large fleet operator had 16 units, including two passenger cars, completely submerged for more than a day. Some of these carried pumps, air compressors and other needed equipment. So these trucks were rushed into service as soon as they could be made to run—regardless of the effect on and subsequent wear of trucks.

In every truck, crankcases were drained and flushed. After pulling several oil pans, several large fleet operators decided that the condition of parts did not make it necessary to pull oil pans. Other fleet operators (not so pressed for time) removed all oil pans to clean out crankcases.

While some fleet operators replaced both starter motors and generators, with the idea of replacing all electric units, most fleet operators found it unnecessary to replace starting motors. Since starter motors operate under about three actual volts pressure, and there is but little insulation to be water damaged, starters gave very little trouble.

Generators were usually replaced and, if not carefully dried out, were found apt to fail in actual service.

Some trouble was experienced with
(TURN TO PAGE 70, PLEASE)



FLEETMEN UNCOVER

Spot

That Cover-Up the

Among the Fleetmen Who Spilled Secrets in This Article Are (A) W. D. Bixby, the (B) Jack Mitchell, Knickerbocker Ice John Wanamaker, Philadelphia; Wm. Adolph,

A VISIT to fleet shops with the question, "How do you finish injured paint surfaces on bodies, fenders and hoods?" brought forth a variety of answers from operators bent on operating spotless trucks. The question put these operators on the spot to spill their secrets. And they spilled.

A number of interesting angles regarding spot repair work were uncovered. First of all, there is the observation that a number of different types of body imperfections come into the fleet shop; each has its problem and while different synthetic finishes may not all act precisely the same on the many kinds of panel bodies, certain fundamentals apply to all. It would be well to note these fundamentals immediately. They are words of caution—and wisdom—offered by fleetmen who appreciate fully the operator's problem of keeping truck appearance at a high level and refinishing costs as low as possible; who have frequently debated the question, "To spot finish or to refinish an entire panel?" Their

answer in chorus is, "Spot, of course." And they offer the following precautions:

1. Daylight is essential for accurate color matching as colors may appear perfect in the shadow of the shop or under artificial light but show up entirely different in sunlight.

2. To really get a true color match, synthetics should be dry. Applying the color sample on a small piece of metal permits it to dry more quickly than any other method. This sample should be placed against a clean section of the body panel. The sharp

line of the sample shows greater contrast in case the match is not a good one.

3. After the color is matched and has been sprayed on, the outer edge of the fresh spray may develop a narrow ring. If the color has been matched perfectly, this is caused by the thinner in the fresh spray. As soon as the spot dries, this ring may be rubbed (polished) out. If there isn't time for the rubbing process, the spot may be treated by spraying clear thinner directly on the spot just applied and mist it on out into the old finish, wetting the

COMMERCIAL CAR JOURNAL
JULY, 1936

Painting

METHODS

Injured Paint Surfaces

On Spot Painting Discussed
United Parcel Service, N.Y.C.;
Co., N.Y.C.; (C) C. W. Goll,
Modern Laundry, Philadelphia

BY STANLEY GERSTIN



Spot painting practices enable fleetmen to execute a quick cover-up of injured and dented panels, fenders and hoods. The illustrations show (1) a dented panel rebuilt with tinner and body solder, sanded and ready for priming; (2) knifing-in putty over the primed and sanded surface; (3) spot-spraying the surfacer on a fender; (4) baking-in the repaired and refinished panel spot for a quick job by concentrating lights whose heat is intensified by reflectors.

been applied and it is necessary to cut down the high spots in order to produce a level surface. In this instance a sanding block with a piece of rubber or a piece of felt an inch thick will serve the purpose. As the sanding progresses the residue should be removed to enable the finisher to see if the surface is leveling properly. Special attention is needed towards the outer edge of the surfaced spot. An added cut with rubbing paste is advised for perfect leveling.

In preparing a body spot where the damage is in the middle of the panel, dry sand the surface as smooth as possible, developing a featheredge around the exposed metal. If the finisher starts with heavy sanding paper, he should switch to a fine paper wet or dry. The featheredge, with fine grit paper, should be carried back from the metal an inch or two and unless fine sand paper is used, scratches on the old paint will show through the new finish. For sanding wet, gasoline is suggested as the best sanding liquid as it aids in producing a finer featheredge. After the sanding operation, the surface should be cleaned thoroughly with a cloth moist with oil free naphtha.

The spot is now ready for the spot primer-surfacer. This shop advises the use of a red oxide primer, claiming that it adheres to the surface and is impossible to remove unless by sanding or with a torch or highly concentrated remover. Red oxide primer is brushed on. When it has thoroughly

6. Dark blues and maroons are difficult colors to match. In matching these colors, the undercoats should be considered as they affect the finish. Matching this undercoat is sometimes necessary.

With these general precautions carefully observed, we may proceed with specific spotting practices of various fleet shops.

A LARGE New York fleet, which has a policy that prevents our naming it, opens the show with some very valuable offerings. The superintendent of the repair department advises sanding out a bad spot with number 240-C sanding paper, and then featheredge. If dented, bump out the spot. Care should be exercised in sanding a badly marked panel. Waves in the metal will be present after a coat of surfacer has

old finish so that it will come up to the color of the spot. The whole panel area will then dry out at once and the spot will not be noticed.

4. When color matching is difficult or the spot fairly large, spraying the entire panel is advisable. Moldings or breaks hide the difference in color.

5. Some spots may show up badly because the undercoat or surfacer was not sanded perfectly. In this case, it is advisable to use a rubbing paste as a final cut on the surfacer so as to featheredge the undercoat absolutely level. Gasoline removes the paste.

FLEETMEN UNCOVER

Spot Painting METHODS

That Cover-Up the Injured Paint Surfaces



Left—Scratches and marks caused by trees, etc., are removed by Jack Mitchell using a thick felt pad dipped in pumice. Circle—Cleaning fenders to the bare metal and re-finishing quickly with primer, surfacer and black enamel is the Wenamaker practice.

dried and has been sanded slightly, it should be knifed in, using knifing putty. This putty surface should be sanded with 150C paper and a coat of surfacer (in color) should be applied over it. When dry, it is well to rub down the spot slightly (with the rubber or felt pad previously mentioned) to remove the nibs. The color coat may then be applied. A thin coat of clear over the color coat finishes the job.

THIS fleet's practice with dented surfaces is rather complete and all inclusive. The dented surface is hammered out. The surface is then cleaned and leveled first with a file and then with heavy sandpaper and prepared for tinning. Body tinner is applied with a hot soldering iron and while hot the surface is finished-off with solder. The body solder is applied immediately with a gasoline torch and leveled off with a block of wood as the work progresses. The efficiency of the wood block, of course, is limited, and after the surface has cooled and hardened, a flexible file may be used to complete the leveling job. From this point on the surface is primed and finished as already described.

In the case of scratches caused by scraping against trees, and where the paint is not marred, these may be removed simply by rubbing with rubbing compound and wiping cloth. Where such marks are not particularly bad, they may be easily removed by using a slight amount of the oil from the rubbing compound. After the marks are wiped out, they should be waxed to finish the spot repair operation.

JACK MITCHELL, chief paint man

at Knickerbocker Ice Co., New York City, though much in accord with the practices just reviewed above, has a few fine points of his own to add. Paintman Mitchell prepares his surface and primes with regular synthetic enamel primer. His knifing putty is mixed from dry white lead and paint the color of the finishing coat. The lead is mixed to a stiff but pliable texture and knifed on to dry over night. Dry sanding is used for synthetic enamel. Two coats of color are applied to the spot.

In the application of spray color over the spot job is where some valuable suggestions are offered. Mr. Mitchell sprays the color coat while holding the gun 6 to 8 in. from the spot, starting at the center. As the outside edge of the spot is gradually reached, the gun is moved away until it is about 12 in. from the surface and the trigger of the gun is gradually eased up, giving more of a thin spray dust. This makes shading into the old finish near the edge of the spot easier and more satisfactory. The second color coat is applied over the first after an interval of 15 to 30 minutes, depending on how clear the weather is, as well as on the temperature of the room where the work is being done. Over the finish coat, a coat of clear is applied—if the finish color is light. No clear is used on dark colors.

Marks on body panels are rubbed with a thick felt pad about 2½ x 4 in. in size, dipped in pumice. If the paint is scratched under the panel marks, a simple treatment calls for slight sanding and a little color applied with a brush.

On the spraying jobs, color coats

are thinned about 30 per cent and applied with 60 lb. pressure on the trigger. Synthetic clear is applied with 10 to 15 lb. less pressure on the gun.

If the spot warrants applying the surfacer with a spray gun, the method recommended is to use the gun with a circular motion with the gun half open. Coats of finish applied over this should extend one beyond the other to assure featheredging the spot perfectly.

THE United Parcel Service in New York City makes frequent and effective use of the cold solder spray gun in touch-up and spot finishing where the surface has been damaged. The damage spot is first scraped clean and washed with a neutralizing acid. The spot is then tinned—if with a welding torch, tinning is done at a low heat to prevent the panel from buckling. Frequently a cold tinner is used. This is a paste compound applied with a rag. Body solder is then applied with a cold solder spray gun over the tinned surface in successive operations. The panel is blocked while still warm from the solder.

Although an ordinary block which has been waxed may be used for the blocking process, paintmen at United Parcel use blocks which they themselves cut and shaped for various purposes. Blocks have been cut, sanded and finished with curved as well as flat surfaces facilitating blocking in corners, curves and angular surfaces where it is otherwise difficult to reach. United Parcel was the only shop visited where such practical blocks were in use, though there is no reason why

(TURN TO PAGE 42, PLEASE)

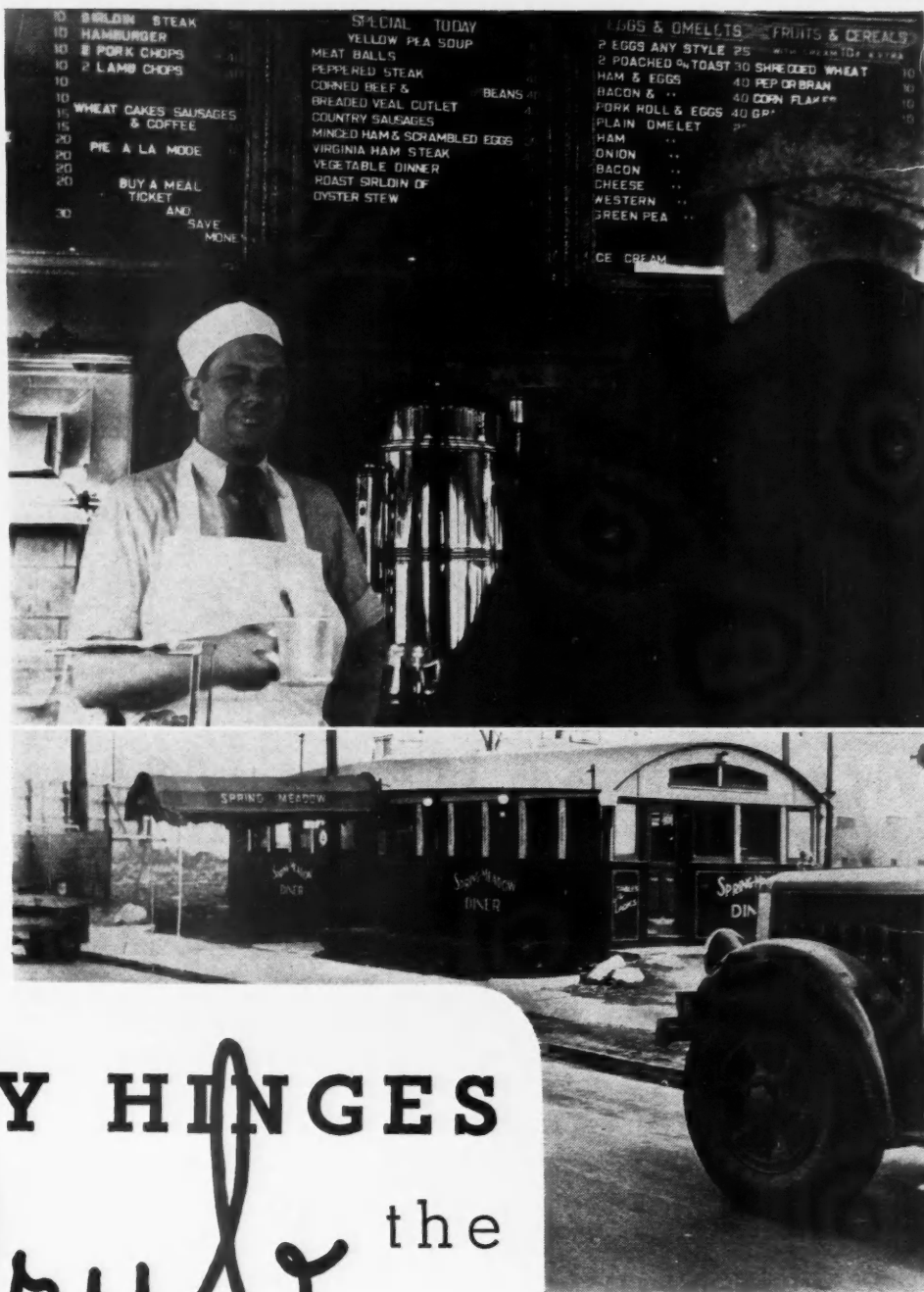
By **SPENCER JONES**

In An Interview With

DR. E. A. FLYNN

Chief, Dept. of Gastro-Enterology,
St. Michael's Hospital,
Newark, N. J.

WHAT a truck driver eats is important, but where he eats and when he eats are even more important than what he eats. Safety depends on his digestion and digestion depends on his physical and mental condition. Anger, anxiety and fatigue suppress the flow of gastric juices; make food hard to digest. For full details on what a bellyache has to do with safety, read the story.



A roadside lunch wagon typical of the nice places in which truck drivers eat. Here food is inexpensive and wholesome

SAFETY HINGES

on the *grub* the

Drivers Grab

SOME time ago the editor of COMMERCIAL CAR JOURNAL proposed to me an article answering these questions: First—What do truck drivers eat? Second—How does it affect their driving? These questions are of practical importance to the fleet operator with heavy investments in equipment

which, of necessity, must be entrusted to the care of drivers.

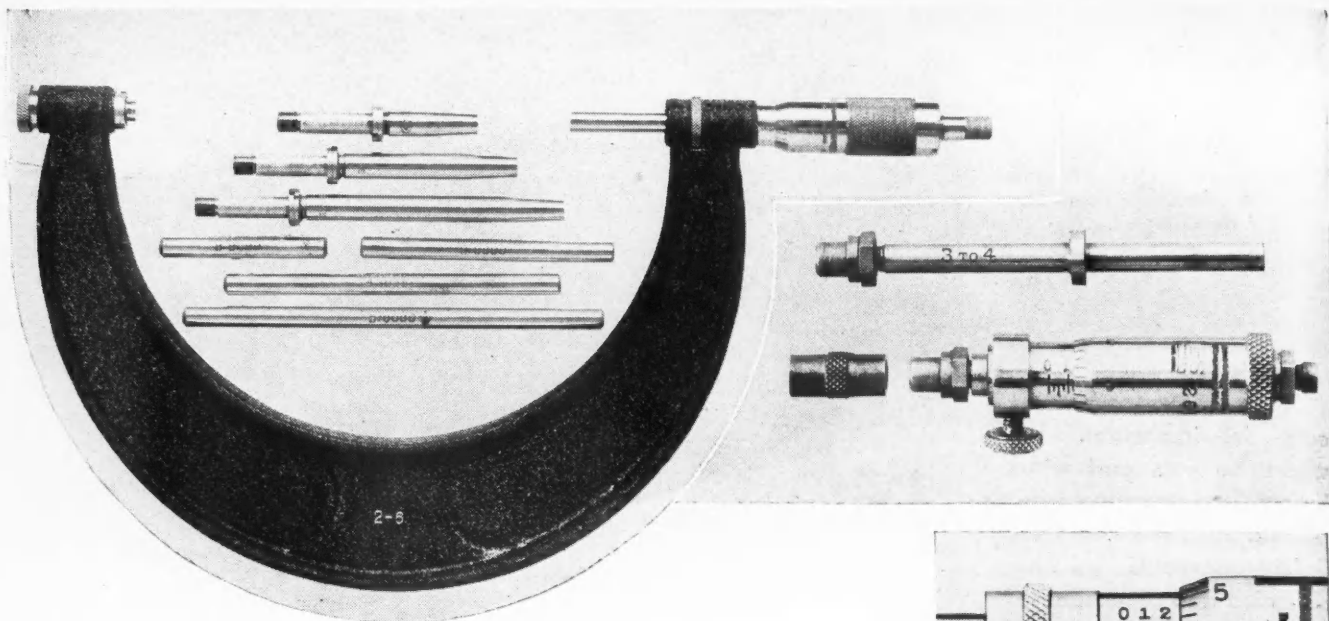
For months, in the course of a cross-country trip, I visited innumerable lunch wagons and other public eating places from Maine to California. I noted the sorts and sizes of meals ordered by hundreds of drivers, together

with my impressions of the drivers. I was suspected of being a plainclothes man, a spotter for some fleet operator, a health department inspector, and a prospective hold-up artist.

Then I took my notes to Dr. E. A. Flynn, chief of the department of Gastro-Enterology at St. Michael's Hospital, Newark, N. J., who is a competent dietitian, and asked him to look them over and analyze them, and outline his general idea of well-balanced, safety-first-promoting meals for truck drivers.

He glanced through the notes, handed them back to me, and said,
(TURN TO PAGE 58, PLEASE)

COMMERCIAL CAR JOURNAL
JULY, 1936



MICROMETERS, though small enough to carry in the overall pocket, rank large as one of the most important tools to the fleet mechanic. Without them it is impossible for the mechanic to know the amount of wear on many automotive parts and, consequently, it is impossible for him to make a wise decision when the time comes to consider reconditioning or replacing the part in question.

There are two kinds of micrometers. The caliper micrometers are used to measure pistons, piston rings, king pins, crankshaft journals, etc. Inside micrometers are used to measure connecting rod bearings, cylinder bores, inside diameter of bushings, etc. Both kinds measure in thousandths of an inch and both kinds remain accurate for long periods of time without adjustment or special care if they are treated as delicate instruments. It is possible to obtain micrometers that measure in ten-thousandths of an inch but there is almost no use for these in a fleet shop.

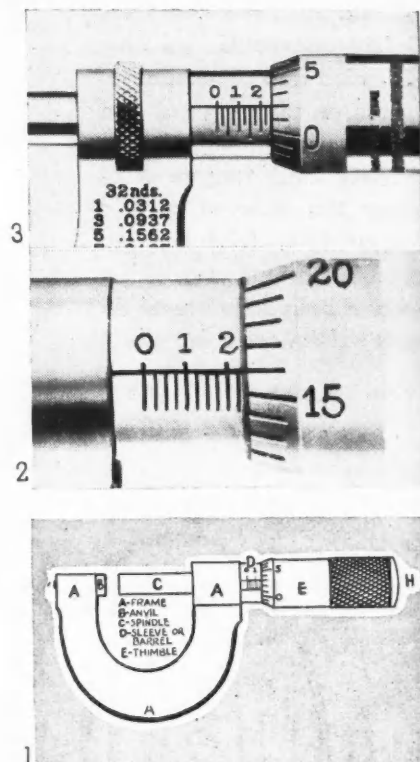
MEASURING with and reading micrometers is really a simple operation. Depending upon the size of the micrometer and the anvil inserted in the frame the measurement may be taken in thousandths of an inch from zero to 6 in. with an ordinary shop micrometer.

A screw free to move in a fixed nut is the chief mechanical principle of the micrometer. The movement of the screw creates the opening between spindle and anvil and this gap is used to

It's a Cinch to READ a "MIKE" HERE'S HOW!

If You Can't Read a Mike Now, This Article (Reading Time 5 min.) Will Enable You to Graduate With the Degree of Master-Mind On Micrometers

measure the work. The size of the gap is indicated by graduations. As the frame "A" (fig. 1) is stationary, the spindle "C" which is attached to the inner sleeve of the thimble "D" approaches or recedes from the anvil "B" when the thimble is revolved. The graduations on the sleeve or barrel "D" are parallel to the end of the thimble and they conform to the pitch of the screw. The beveled edge of the thimble "D" carries the graduations which



Top—(left) An outside micrometer and (right) an inside micrometer. Above—Detailed explanations of Fig. 1, 2 and 3 are given in the article

enable readings in one-thousandths of an inch to be taken.

The pitch of the screw is $1/40$ in. which means 40 threads to the inch. Thus the distance traveled by the spindle in one complete revolution is $1/40$ in. or .025 in. As the graduations on the barrel conform to the pitch of the screw each division represents .025 in. Each four divisions equal .100, .200, etc., up to 1.000 or a full inch, and they are labelled 1, 2, etc., and each digit on the barrel or sleeve represents .100 in. or $1/10$ in. Hence the figure 8 on the barrel or sleeve means .800 or $8/10$ in.

The beveled edge of the thimble is graduated into 25 parts and since each

(TURN TO PAGE 64, PLEASE)

TRUCK SERVICE Specifications

and Lubricant Capacities of Current Models

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PRACTICALLY all truck manufacturers are represented in the following service specification tables which gives to fleet operators, for the first time, truck manufacturers' complete recommendations for engine tune-up, and lubricant capacities for

engines, transmissions and rear axles. The tune-up specifications appeared in the May, 1935 issue of COMMERCIAL CAR JOURNAL but the original table has been brought up to date and much information has been added to the table to make it complete.

The information could not have been compiled and published here if it had not been for the splendid cooperation of the truck manufacturers and, in particular, the individuals who disburse engineering information. Appreciation of the generous part these men played in making possible the publication of these important details is hereby acknowledged.

COMMERCIAL CAR JOURNAL feels sure that their efforts will be rewarded. The importance of maintaining trucks to factory standards cannot be too highly stressed. Truck manufacturers insist that it is the only way to get satisfactory performance. They have spent a great deal of time and money in arriving at satisfactory specifications.

The information contained in this table is the result of a great deal of expert effort and certainly the wisdom of taking advantage of expert opinion and research is obvious.

TRUCK MAKE AND MODEL	Engine Make and Model	Number of Cylinders, Bore and Stroke	Piston Material	Connecting Rods Removed From	Normal Oil Pressure Lb. at M.P.H. or R.P.M.	Intake Valve Opens B-Before A-After		Intake Tapet Clearance for Valve Timing	OPERATING TAPPET CLEARANCE		SPARK PLUG				Breaker Point Gap	Spark Occurs TC B-Before A-After	Spark Occurs Flywheel Teeth TC B-Before A-After	Breaker Housing	LUBRICANT CAPACITY Q-Qt. L-Lb.			Cooling System Capacity (Qt.)	Comp. Pressure at Cranking Speed
						°TC	Flywheel Teeth TC		Intake	Exhaust	Make	Type	Size	Gap					Engine	Transmission	Rear Axle		
ARMLEDER—21H, 21HA	Her WXC	6-4x4 1/2	CI	Top	35-2500 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	7	12 Q	5 1/2 Q	20	92
31H, 31HA, 41H, 41HA, 61H, 61HA	Her WXC2	6-4 1/2 x4 1/2	CI	Top	35-2500 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	7	12 Q	.....	20	92
71H, 71HA, TRDB	Her RXC	6-4 1/2 x5 1/2	CI	Top	35-2500 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	10	15 Q	6 Q	44	84
TRD	Her YXC	6-4 1/2 x4 1/2	CI	Top	35-2500 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	.....	.....	.....	.....	75
TRDA	Her YXC3	6-4 1/2 x4 1/2	CI	Top	35-2500 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	.....	.....	.....	.....	75
10A, 12A (1936)	Her JXB	6-3 1/2 x4 1/2	AI	Top	30-2400 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	6	5 Q	4 Q	26	86
15A (1936)	Her JXC	6-3 1/2 x4 1/2	AI	Top	30-2400 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	6	5 1/2 Q	4 Q	27	86
10A (1936)	Her JXD	6-4x4 1/2	AI	Top	30-2400 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	6	5 1/2 Q	4 Q	27	86
25A (1936)	Her WXC2	6-4 1/2 x4 1/2	AI	Top	30-2400 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	7	12 Q	7 Q	20	75
20A (1936)	Her JXD	6-4x4 1/2	AI	Top	30-2400 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	6	5 1/2 Q	7 Q	20	75
28A (1936)	Her WXC3	6-4 1/2 x4 1/2	AI	Top	30-2400 2"A	3/4	A	.010	.006	.010	Ch	.....	3/8	.025	.020	TC	TC	Re	7	12 Q	7 1/2 Q	20	75
AUTOCAR—RH, DF, RHT, DT, DFT, RHD, DP, 6D, DH, UD, UDF, UDT, UDP	Own 358	6-4x4 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	2 COM	3/8	P	D	8 1/2 B	1 1/2 B	.....	12	7 Q	6 Q	27	98
6RH, 6D, 6DF, 6UD, UDF, N, NT, 6N, UN, UNT, 6UN	Own 358	6-4x4 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	2 COM	3/8	P	D	8 1/2 B	1 1/2 B	.....	12	7 Q	9 Q	27	98
4X4DF, 4X4N	Own 404	6-4 1/2 x4 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	2 COM	3/8	P	Z	2 B	1 1/2 B	.....	14	7 Q	9 Q	27	95
NF, NFT, 6NF, UNF, UNFT, 6UNF, S, US	Own 404	6-4 1/2 x4 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	2 COM	3/8	P	Z	2 B	1 1/2 B	.....	14	7 Q	.....	37	95
4X4NF	Own 453	6-4 1/2 x4 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	2 COM	3/8	P	Z	2 B	1 1/2 B	.....	14	7 Q	.....	42	95
T, TT, 6T, UT	Own 501	6-4 1/2 x5 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	8 COM	18mm	P	Z	2 B	1 1/2 B	.....	14	7 Q	9 Q	39	95
UTT, 6UT	Own 501	6-4 1/2 x5 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	8 COM	18mm	P	Z	2 B	1 1/2 B	.....	14	7 Q	9 Q	41	95
N75C	Own 501	6-4 1/2 x5 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	8 COM	18mm	P	Z	2 B	1 1/2 B	.....	14	7 Q	6 Q	42	95
4X4S	Own 501	6-4 1/2 x5 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	8 COM	18mm	P	Z	2 B	1 1/2 B	.....	14	A	8	42	95
C	Own 501	6-4 1/2 x5 1/2	Ala	Top	40-2200 TC	TC	TC	.015	.015	.018	Ch	8 COM	18mm	P	Z	2 B	1 1/2 B	.....	14	C	10 Q	39	95
TF, TFT, 6TF	Wau 6RB	6-5x5 1/2	Ala	Top	40-1750 10"A	3 3/4	A	.006	.006	.010	Ch	2 COM	3/8	P	Z	9 B	3 1/2 B	.....	14	C	9 Q	37	80
AVAILABLE—X-110 (1935-36)	Con F-S	6-3 1/2 x4 1/2	CI	Top	40-1500 2"B	1 1/2	B	.013	.010	.010	AC	D12	18mm	.030	.020	TC	TC	Ad	5	8 L	12 L	11	85
W-120, WS-125, W-150 (1935-36)	Wau 6BL	6-3 1/2 x4 1/2	AI	Top	40-1500 TC	TC	TC	.010	.010-.012	.012-.014	AC	D12	18mm	.030	.020	TC	TC	Ad	8	8 L	12 L	18	112
W-170, WS-175 (1935-36)	Wau 6BL	6-3 1/2 x4 1/2	AI	Top	40-1500 TC	TC	TC	.010	.010-.012	.012-.014	AC	D12	18mm	.030	.020	TC	TC	Ad	8	8 L	11 L	18	112
W-210, W-240, WS-245 (1935-36)	Wau 6BK	6-3 1/2 x4 1/2	AI	Top	40-1500 TC	TC	TC	.010	.010-.012	.012-.014	AC	D12	18mm	.030	.020	TC	TC	Ad	8	11 L	14 L	18	112
W-300, WS-305 (1935-36)	Wau 6-110	6-4x4 1/2	AI	Top	40-1500 15"B	TC	TC	.010	.010-.012	.014-.016	AC	D12	18mm	.030	.020	TC	TC	Ad	8	24 L	15 L	36	97
W-400 WS-405 (1935-36)	Wau 6-125	6-4 1/2 x5 1/2	AI	Top	40-1500 42"B	TC	TC	.010	.010-.012	.018-.020	AC	D12	18mm	.030	.020	TC	TC	Ad	10	30 L	15 L	48	96
BIEDERMAN—10 (1935-36)	Con 25A	6-3 1/2 x4	CI	Top	50-20 5"B	1 1/2	B	.012	.008	.010	Ch	C7	18mm	.025	.020	TC	TC	Ad	5	.....	.....	16	87
20, 30 (1935-36)	Wau 6BL	6-3 1/2 x4 1/2	CI	Top	50-20 TC	TC	TC	.010	.006-.008	.010-.012	Ch	C7	18mm	.025	.020	TC	TC	Re	6	.....	.....	24	112
40 (1935-36)	Wau 6BK	6-3 1/2 x4 1/2	CI	Top	50-20 TC	TC	TC	.010	.006-.008	.010-.012	Ch	C7	18mm	.025	.020	TC	TC	Re	6	.....	.....	24	112
50 (1935-36)	Con E601	6-3 1/2 x4 1/2	CI	Top	50-20 8"B	2 1/2	B	.012	.007H	.012	Ch	C7	18mm	.....	.....	.....	.....	8	.....	.....	.....	24	.....
60 (1935-36)	Con E602	6-4 1/2 x4 1/2	CI	Top	50-20 8"B	2 1/2	B	.012	.007H	.012	Ch	C7	18mm	.....	.....	.....	.....	8	.....	.....	.....	24	.....
70 (1935-36)	Her WXC3	6-4 1/2 x4 1/2	AI	Top	25-20 2"A	.....	.....	.010	.006	.010	Ch	2	3/8	.025	.020	TC	TC	Re	7	.....	.....	28	.....
80 (1935-36)	Her RXB	6-4 1/2 x5 1/2	AI	Top	25-20 2"A	.....	.....	.010	.006	.010	Ch	2	3/8	.025	.020	TC	TC	Re	10	.....	.....	32	.....
BROCKWAY 60 (1935)	Con 26B	6-3 1/2 x4	CI	Bot	20-20 5"B	1 1/2	B	.012	.008	.010	Ch	8 COM	18mm	.025	.020	TC	TC	Ad	5 1/2	3 Q	4 Q	12	67
80 (1935)	Con 25A	6-3 1/2 x4	CI	Bot	20-20 5"B	1 1/2	B	.012	.008	.010	Ch	8 COM	18mm	.025	.020	TC	TC	Ad	5 1/2	3 Q	4 Q	12	67
65 (1935)	Con 27B	6-3 1/2 x4 1/2	CI	Bot	20-20 5"B	1 1/2	B	.012	.008	.010	Ch	8 COM	18mm	.025	.020	12"B	3B	Ad	6	2 1/2 Q	3 Q	16	88
75, 90 (1935)	Con 16C	6-3 1/2 x4 1/2	CI	Bot	20-20 5"B	1 1/2	B	.012	.008	.010	Ch	8 COM	18mm	.025	.020	12"B	3B	Ad	6	3 Q	4 Q	16	88
90 (1935)	Con 28B	6-3 1/2 x4 1/2	AI	Bot	20-20 5"B	1 1/2	B	.012	.008	.008	Ch	8 COM	18mm	.025	.020	5"B	1 1/2 B	Ad	6	3 Q	4 Q	17	95
100 (1935)	Con 20C	6-3 1/2 x4 1/2	AI	Bot	20-20 5"B	1 1/2	B	.012	.008	.008	Ch	8 COM	18mm	.025	.020	5"B	1 1/2 B	Ad	6	12 Q	4 Q	17	95
120, 140, 141 (1935)	Con 30B, 16R	6-4x4 1/2	CI	Bot	30-20 5"A	2A	.....	.014	.012	.015	Ch	8 COM	18mm	.025	.020	10"B	4B	Ad	10	8 Q	4 Q	28	75
170 (1935)	Con 33B	6-4 1/2 x4 1/2	AI	Bot	30-20 5"B	2B	.....	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15"B	5 1/2 B	Ad	10	10 1/2 Q	4 1/2 Q	30	78
195 (1935)	Con 20R	6-4 1/2 x4 1/2	AI	Bot	30-20 5"B	2B	.....	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15"B	5 1/2 B	Ad	10	10 1/2 Q	5 Q	30	78
175X (1935)	Con 34B	6-4 1/2 x4 1/2	AI	Bot	30-20 5"B	2B	.....	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15"B	5 1/2 B	Ad	10	10 1/2 Q	4 1/2 Q	30	82

TRUCK MAKE AND MODEL	Engine Make and Model	Number of Cylinders, Bore and Stroke	Piston Material	Connecting Rods Removed From	Normal Oil Pressure Lb. at M.P.H. or R.P.M.	Intake Valve Opens B-Before A-After		Intake Tappet Clearance for Valve Timing	OPERATING TAPPET CLEARANCE		SPARK PLUG				Breaker Point Gap	Spark Occurs °C B-Before A-After	Spark Occurs Flywheel Teeth °C B-Before A-After	Breaker Housing	LUBRICANT CAPACITY Q-Qt. L-Lb.			Cooling System Capacity (Qt.)	Comp. Pressure at Cranking (P.S.I.)
						°C	Flywheel Teeth TC		Intake	Exhaust	Make	Type	Size	Gap					Engine	Transmission	Rear Axle		
BROCKWAY—Cont.																							
180S (1935)	Con 21R	6-4 1/2 x 4 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 10 1/2	6 Q	30	82		
220 (1935)	Con 21R	6-4 1/2 x 4 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 10 1/2	7 Q	30	82		
240 (1935)	Con 35B	6-4 1/2 x 5 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 15 Q	5 Q	31	82		
260 (1935)	Con 22R	6-4 1/2 x 5 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 10 1/2	6 Q	30	82		
250, 290 (1935)	Con 36B	6-4 1/2 x 5 1/2	Al	Bot	30-20	TC	TC	.0075	.008	.008	Ch	0 COM	3/8	.025	.020	10°B	Re	16 24 Q	10 Q	40	74		
640 (1935)	Con 16H	6-4 1/2 x 4 1/2	Al	Bot	30-20	TC	TC	.0075	.008	.008	Ch	0 COM	3/8	.025	.020	10°B	Re	16 24 Q	24 Q	40	74		
125 (1935)	Con 31B, E601	6-3 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	9 12 Q	4 Q	28	81		
150 (1935)	Con 32B	6-4 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	9 12 Q	5 1/2 Q	28	81		
160, 180 (1935)	Con E502	6-4 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	9 12 Q	6 Q	28	81		
78 (1935)	Con 24B	6-3 1/2 x 4 1/2	Al	Bot	20-20	2°B	3/8 B	.015	.010	.010	Ch	8 COM	18mm	.025	.020	8°B	Ad	5 3 Q	3 1/2 Q	16	95		
87 (1935)	Con 28B	6-3 1/2 x 4 1/2	Al	Bot	20-20	5°B	1 1/2 B	.012	.008	.010	Ch	8 COM	18mm	.025	.020	5°B	Ad	6 3 Q	3 1/2 Q	17	95		
88, 92 (1935)	Con 25B	6-3 1/2 x 4 1/2	Al	Bot	20-20	5°B	1 1/2 B	.012	.008	.010	Ch	8 COM	18mm	.025	.020	5°B	Ad	6 3 Q	5 Q	17	95		
90X (1935)	Con 28B	6-3 1/2 x 4 1/2	Al	Bot	20-20	5°B	1 1/2 B	.012	.008	.010	Ch	8 COM	18mm	.025	.020	5°B	Ad	6 3 Q	5 Q	17	95		
94 (1935)	Con 25B	6-3 1/2 x 4 1/2	Al	Bot	20-20	5°B	1 1/2 B	.012	.008	.010	Ch	8 COM	18mm	.025	.020	5°B	Ad	6 3 Q	5 1/2 Q	15	95		
96, 110 (1935)	Con 29B	6-3 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	8 4 Q	5 Q	23	90		
125X (1935)	Con 31B	6-3 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	8 4 Q	5 Q	23	90		
130 (1935)	Con 29B	6-3 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	8 4 Q	6 1/2 Q	23	90		
145 (1935)	Con 31B	6-3 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	8 4 Q	6 1/2 Q	23	90		
150X4 (1935)	Con 32B	6-4 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	8 4 Q	6 1/2 Q	23	90		
150X5 (1935)	Con 32B	6-4 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	8 12 Q	6 1/2 Q	23	90		
160X, 180XSBT (1935)	Con 32B	6-4 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	8 12 Q	6 1/2 Q	23	90		
165X (1935)	Con 32B	6-4 1/2 x 4 1/2	Al	Bot	30-20	8°B	2 1/2 B	.015	.012	.012	Ch	8 COM	18mm	.025	.020	8°B	Ad	8 12 Q	8 Q	30	80		
170X (1935)	Con 33B	6-4 1/2 x 4 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 15 Q	5 1/2 Q	30	82		
175X (1935)	Con 34B	6-4 1/2 x 4 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 15 Q	8 Q	30	82		
180X-SBT Spec. (1935)	Con 34B	6-4 1/2 x 4 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 15 Q	6 1/2 Q	30	82		
195X (1935)	Con 33B	6-4 1/2 x 4 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 15 Q	8 Q	30	82		
220X (1935)	Con 34B	6-4 1/2 x 4 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 15 Q	8 Q	30	82		
240X (1935)	Con 35B	6-4 1/2 x 5 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 15 Q	9 Q	32	82		
260X (1935)	Con 35B	6-4 1/2 x 5 1/2	Al	Bot	30-20	5°B	2B	.014	.012	.015	Ch	8 COM	18mm	.025	.020	15°B	Ad	10 15 Q	9 Q	32	82		
CHEVROLET—1 1/2 Ton (1935)																							
1 1/2 Ton (1935)	Own	6-3 1/2 x 4	Cl	Top	9°B	3 1/2 B	.006	.006	.013	AC	K11	14mm	.032	.018	5°B	1 1/2 B	Ad	5 1 1/4 Q	2 1/4 Q	15	112		
1 1/2 Ton (1935)	Own	6-3 1/2 x 4	Cl	Top	9°B	3 1/2 B	.006	.006	.013	AC	K11	14mm	.032	.018	5°B	1 1/2 B	Ad	5 3 3/4 Q	3 3/4 Q	15	112		
1 1/2 Ton (1935)	Own	6-3 1/2 x 4	Cl	Top	8°B	3B	.006	.006	.013	AC	K11	14mm	.032	.018	5°B	1 1/2 B	Ad	5 3 3/4 Q	2 1/4 Q	10 1/2	86		
1 1/2 Ton (1934)	Own	6-3 1/2 x 4	Cl	Top	4°B	1 1/2 B	.006	.006	.013	AC	K10	14mm	.032	.018	10°B	3 1/2 B	Ad	5 3 3/4 Q	3 1/4 Q	10 1/2	83		
1 1/2 Ton (1934)	Own	6-3 1/2 x 4	Cl	Top	4°B	1 1/2 B	.006	.006	.013	AC	K10	14mm	.032	.018	10°B	3 1/2 B	Ad	5 3 3/4 Q	3 1/4 Q	10 1/2	83		
CORBITT—12B (1935)																							
14B (1935)	Wau 6BL	6-3 1/2 x 4 1/2	Al	Bot	40-1500	TC	TC	.010	.010-.012	.010-.012	AC	D8-D10	18mm	.030	.025	5°B	.....	8 4 Q	6 Q	26	112	
Series 18 (1935)	Wau 6BK	6-4 1/2 x 4 1/2	Al	Bot	40-1500	7°A	.....	.006	.008-.010	.012-.014	AC	D8-D10	18mm	.030	.025	7°B	.....	8 12 Q	7 Q	30	89
Series 22 (1935)	Wau 6MK	6-4 1/2 x 4 1/2	Al	Bot	40-1500	7°A	.....	.006	.008-.010	.012-.014	AC	D8-D10	18mm	.030	.025	7°B	.....	8 12 Q	7 1/2 Q	30	89
Series 27D (1935)	Wau 6SRL	6-4 1/2 x 5 1/2	Al	Bot	40-1500	6°A	.....	.009	.008-.010	.016-.018	AC	L8-L10	3/8	.030	.025	TC	TC	10 12 Q	7 1/2 Q	38	80
Series 35, 40 (1935)	Wau 6SRK	6-4 1/2 x 5 1/2	Al	Bot	40-1500	7°A	.....	.006	.008-.010	.016-.018	AC	L8-L10	3/8	.030	.025	7°B	.....	10 15 Q	9 Q	50	80
F12 (1935)	Wau 6BL	6-3 1/2 x 4 1/2	Al	Bot	40-1500	TC	TC	.010	.010-.012	.010-.012	AC	D8-D10	18mm	.030	.025	5°B	.....	8 4 Q	6 Q	26	112	
F15 (1935)	Wau 6BK	6-3 1/2 x 4 1/2	Al	Bot	40-1500	TC	TC	.010	.012-.014	.012-.014	AC	D8-D10	18mm	.030	.025	5°B	.....	8 4 Q	6 Q	26	112	
F18 (1935)	Wau 6MK	6-4 1/2 x 4 1/2	Al	Bot	40-1500	7°A	.....	.006	.008-.010	.012-.014	AC	D8-D10	18mm	.030	.025	7°B	.....	8 4 Q	5 1/2 Q	30	89
F23 (1935)	Wau 6SRL	6-4 1/2 x 5 1/2	Al	Bot	40-1500	6°A	.....	.009	.008-.010	.016-.018	AC	L8-L10	3/8	.030	.025	TC	TC	10 15 Q	5 1/2 Q	38	80
F27 (1935)	Wau 6SRK	6-4 1/2 x 5 1/2	Al	Bot	40-1500	7°A	.....	.006	.008-.010	.016-.018	AC	L8-L10	3/8	.030	.025	7°B	.....	10 12 Q	8 Q	38	80
F35 (1935)	Wau 6RB	6-5 1/2 x 4 1/2	Al	Bot	40-1500	9°A	.....	.006	.008-.010	.016-.018	AC	L8-L10	3/8	.030	.025	7°B	.....	14 12 Q	8 1/2 Q	50	81
DIAMOND T—211 (1935)																							
220 (1935)	Her JXA	6-3 1/2 x 4 1/2	Al	Top	25-30	5°A	1 1/2 A	.006	.008	.010	AC	L12	3/8	.027	.020	TC	TC	Re	6 2 Q	2 1/2 Q	22	96 1/2	
227, 243 (1935)	Her JXB	6-3 1/2 x 4 1/2	Al	Top	25-30	5°A	1 1/2 A	.006	.008	.010	AC	L12	3/8	.027	.020	TC	TC	Re	6 2 Q	2 1/2 Q	23	103	
311 (1935)	Her JXA	6-3 1/2 x 4 1/2	Al	Top	25-30	5°A	1 1/2 A	.006	.008	.010	AC	L12	3/8	.027	.020	TC	TC	Re	6 2 Q	4 Q	23	103	
312 (1935)	Her JXB	6-3 1/2 x 4 1/2	Al	Top	25-30	5°A	1 1/2 A	.006	.008	.010	AC	L12	3/8	.027	.020	TC	TC	Re	6 3 1/2 Q	4 Q	24 1/2	102	
351C (1935)	Her JXC	6-3 1/2 x 4 1/2	Al	Top	25-30	5°A	1 1/2 A	.006	.008	.010	AC	L12	3/8	.027	.020	TC	TC	Re	6 6 Q	5 Q	24 1/2	102	
352 (1935)	Her JXC	6-3 1/2 x 4 1/2	Al	Top	25-30	5°A	1 1/2 A	.006	.008	.010	AC	L12	3/8	.027	.020	TC	TC						

TRUCK MAKE AND MODEL	Engine Make and Model	Number of Cylinders, Bore and Stroke	Piston Material	Connecting Rods Removed From	Normal Oil Pressure Lb. at M.P.H. or R.P.M.	Intake Valve Opens B-Before A-After		Intake Tappet Clearance for Valve Timing	OPERATING TAPPET CLEARANCE		SPARK PLUG				Breaker Point Gap	Spark Occurs TC B-Before A-After	Spark Occurs Flywheel Teeth TC B-Before A-After	Breaker Housing	LUBRICANT CAPACITY Q-Qt. L-Lb.			Cooling System Capacity (Qt.)	Comp. Pressure at Cranking Speed
						°TC	Flywheel Teeth TC		Intake	Exhaust	Make	Type	Size	Gap					Engine	Transmission	Rear Axle		
FAGEOL—Cont.																							
370SR	Wau 6SRK	6-4½x5½	Al	Top	40-30	7°A		.008C	.008C	.016C	Ch		¾	.030	.025	27°A		10	R	8 Q	54		
370RA	Wau 6-125	6-4½x5½	Al	Top	40-30	42°B		.010C	.010C	.018C	Ch		18mm	.030	.025	26°A		10	R	9 Q	54		
370D	Wau 6D-125	6-4½x5½	Al	Top	30-30	6°B		.012C	.012C	.018C	No	No	No	No	Inj	17°B						550	
370RAD	Wau 6D-125	6-4½x5½	Al	Top	30-30	6°B		.012C	.012C	.018C	No	No	No	No	Inj	17°B						550	
470HP	Wau 6-125	6-4½x5½	Al	Top	40-30	42°B		.010C	.010C	.018C	Ch		18mm	.030	.025	26°A		10	W	8 Q	54		
470D	Wau 6D-125	6-4½x5½	Al	Top	30-30	6°B		.012C	.012C	.018C	No	No	No	No	Inj	17°B		10	W	9 Q	54		
685RB	Wau 6RB	6-5x5½	Al	Top	40-30	10°A		.004	.004	.008C	Ch		¾	No	No	24°A		14	R	9 Q	56		
278HP2R	Wau 6-110	6-4x4½	Al	Top	40-30	15°B		.010C	.010C	.014C	Ch		18mm	.030	.025	28°A		8	R	7 Q	30		
328HP2R	Wau 6D100	6-4½x5½	Al	Top	30-30	6°B		.012C	.012C	.018C	No	No	No	No	Inj	21°B		8	R	7½ Q	34		
D328-2R	Wau 6-125	6-4½x5½	Al	Top	40-30	42°B		.010C	.010C	.018C	Ch		18mm	.030	.025	26°A		10	X	8 Q	54		
8-48HP4R-8-46AL4R	Wau 6D-125	6-4½x5½	Al	Top	30-30	6°B		.012C	.012C	.018C	No	No	No	No	Inj	17°B		10	X	8 Q	54		
8-46ALD4R	Wau 6RB	6-5x5½	Al	Top	40-30	10°A		.004	.004	.008C	Ch		¾	.030	.025	24°A		14	X	10 Q	56		
10-46RB4R-10-46AL4H	Wau 6D-140	6-5x5½	Al	Top	30-30	6°B		.012C	.012C	.018C	No	No	No	No	Inj	17°B		14	X	10 Q	56		
10-46ALD4R	Wau V	8°A						.005	.005	.008				.030	.025	29°A							
130	Wau 6TS	8°A						.008	.008	.012				.030	.025	27°A							
106	Wau 6SRL	7°A						.008	.008	.016				.030	.025	27°A							
370		10°A						.004	.004	.008				.030	.025	24°A							
370RB																							
FEDERAL—15X, 15																							
18X, 20, 21, 22	Her JXA	6-3½x4½				5°A	1½A	.006	.008	.010				.025	.025	TC	TC	Ad					
25	Her JXB	6-3½x4½				5°A	1½A	.006	.008	.010				.025	.025	TC	TC	Ad					
30	Her JXC	6-3½x4½				5°A	1½A	.006	.008	.010				.025	.025	TC	TC	Ad					
40	Wau 6MS	6-4½x4½				8°A	3A	.004	.010	.012				.025	.025	TC	TC	Ad					86
50	Wau 6MK	6-4½x4½				8°A	3A	.004	.010	.012				.025	.025	TC	TC	Ad					80
60	Wau 6MZ	6-4½x4½				8°A	3A	.004	.010	.012				.025	.025	TC	TC	Ad					80
C7, C8, C7W, C8W	Wau 6SRK	6-4½x5½				10°A	3½A	.004	.010	.012				.025	.025	TC	TC	Ad					80
DM (1936)	Con W10	4-3½x4½																					
10 (1936)	Her OOB	4-3½x4½																					
20 (1936)	Her JXC	6-3½x4½																					
29 (1936)	Her JXD	6-4x4½																					
40DR (1936)	Wau 6MK	6-4½x4½																					
T10B (1936)	Con 18R	6-4x4½																					
T10W	Con 18R	6-4x4½																					
X8RDR-X8R	Wau 6SRK	6-4½x5½																					
FORD—AA (1929-31)																							
BB 4 cyl. (1932-33)	Own	4-3½x4½	Al	Top	No	8°B	2½B	.013	.010-.013	.015-.017	Ch	C4	¾	.035	Z	TC	TC	Re	5	2½ L	9 L	13½	75
BBV8 (1932-33)	Own	4-3½x4½	Al	Top	No	8°B	2½B	.013	.010-.013	.020-.022	Ch	C4	¾	.030	Z	15°B	5B	Re	5	2½ L	9 L	13½	90
BB 4 cyl. (1934)	Own	4-3½x4½	Al	Top	30-2000	8°B	2½B	.013	Y	.025-.027	Ch	C4	7	.025	V	4°B	1½B	Re	5	2½ L	9 L	22	105
BB V8 (1934)	Own	4-3½x4½	Al	Top	30-2000	8°B	2½B	.013	Y	.025-.027	Ch	C4	7	.030	Z	15°B	5B	Re	5	2½ L	9 L	22	90
51 V8 (1935-36)	Own	8-3½x3½	CA	Top	30-2000	8°B	3B	.013	Y	.025-.027	Ch	C4	7	.025	V	4°B	1½B	Re	5	2½ L	9 L	25	90
GENERAL MOTORS																							
T84 (1935)	Own 450	8-4½x5	Al	Top	42-	8°B		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	14	14 L	16 L	34	
T78 (1935)	Own 450	6-4½x5	Al	Top	42-	8°B		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	14	14 L	16 L	32	
T83 (1935)	Own 450	6-4½x5	Al	Top	42-	8°B		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	14	14 L	16 L	32	
T83 (1935)	Own 400	6-4½x5	Al	Top	42-	8°B		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	12	14 L	16 L	34	
T75 (1935)	Own 400	6-4½x5	Al	Top	42-	8°B		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	12	14 L	16 L	32	
T75H (1935)	Own 400	6-4½x5	Al	Top	42-	8°B		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	12	14 L	16 L	32	
T51 (1935)	Own 331	6-3½x5	Al	Top	35-	9°A		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	12	8½ L	9 L	26	
T51H (1935)	Own 331	6-3½x5	Al	Top	35-	9°A		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	12	8½ L	9 L	26	
T71W (1934)	Own 331	6-3½x5	Al	Top	35-	9°A		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	12	8½ L	9 L	26	
T74 (1935)	Own 331	6-3½x5	Al	Top	35-	9°A		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	12	8½ L	9 L	32	
T74H (1935)	Own 331	6-3½x5	Al	Top	35-	9°A		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	12	8½ L	9 L	32	
T43 (1935)	Own 257	6-3½x4½	Al	Top	30-	4°B		.012	.012	.012	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	20	
T73 (1935)	Own 257	6-3½x4½	Al	Top	30-	4°B		.012	.012	.012	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	20	
T73H (1935)	Own 257	6-3½x4½	Al	Top	30-	4°B		.012	.012	.012	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	20	
T16 (1935)	Olds 6	6-3½x4½	Al	Top	30-	5°B		.010	.010	.010	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	13	
T18 (1935)	Own 221	6-3½x4½	Al	Top	30-	5°B		.012	.012	.012	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	20	
T18H (1936)	Own 239	6-3½x4½	Al	Top	30-	4°B		.012	.012	.012	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	16	
T23 (1935)	Own 221	6-3½x4½	Al	Top	30-	4°B		.012	.012	.012	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	20	
T23H (1936)	Own 257	6-3½x4½	Al	Top	30-	4°B		.012	.012	.012	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	20	
T33 (1935)	Own 257	6-3½x4½	Al	Top	30-	4°B		.012	.012	.012	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	18	
T33, T33H (1936)	Own 286	6-3½x4½	Al	Top	30-	4°B		.012	.012	.012	AC	G9	18mm	.035	Z	15°B		Re	12	8½ L	9 L	20	
T46 (1935)	Own 331	6-3½x5	Al	Top	35-	5°B		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	14	8½ L	9 L	22	
T81 (1935)	Own 400	6-4½x5	Al	Top	42-	8°B		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	14	10 L	15 L	34	
T81H-T61 (1936)	Own 400	6-4½x5	Al	Top	42-2300	8°B		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	14	14 L	16 L	34	
T46H (1935)	Own 331	6-3½x5	Al	Top	35-	9°A		.012	.012	.012	AC	G9	18mm	.035	Z	17°B		Re	14	14 L	16 L	34	
T14 (1936)	Olds 6	6-3½x4½																					

TRUCK MAKE AND MODEL	Engine Make and Model	Number of Cylinders, Bore and Stroke	Piston Material	Connecting Rods Removed From	Normal Oil Pressure Lb. at M.P.H. or R.P.M.	Intake Valve Opens B-Before A-After		Intake Tapet Clearance for Valve Timing	OPERATING TAPPET CLEARANCE			SPARK PLUG				Breaker Point Gap	Spark Occurs TC B-Before A-After	Spark Occurs Fly-Wheel Teeth TC B-Before A-After	Breaker Housing	LUBRICANT CAPACITY Q-Qt. L-Lb.			Cooling System Capacity (Qt.)	Comp. Pressure at Cranking, Speed
						°TC	Flywheel Teeth TC		Intake	Exhaust	Make	Type	Size	Gap	Engine					Transmission	Rear Axle			
INTERNATIONAL—																								
C1, C15, C30, CS30, C30S	Own HD3	6-3 1/2 x 4 1/2	CI	Top	25-600	TC	TC	.010	.010	.010	AC	G9	18mm	K	D	6°B	1 1/2 B	Ad	6 1/2	2 1/2 Q	4 1/2 Q	15 1/2	95	
A1, A2, B2, M2, M3, C10, C20, CS20	Wau XAH	4-3 1/2 x 4 1/2	CI	Bot	20-2200	10°A	3A	.004	.005	.007	AC	A8	7/8	K	D	5°B	1 1/2 B	Ad	4	2 1/2 Q	4 1/2 Q	17 1/2	72	
B3	Own FAB2	6-3 1/2 x 4 1/2	CI	Bot	40-1400	10°A	3A	.024	.015	.015	AC	A8	7/8	K	D	5°B	1 1/2 B	Ad	7	2 1/2 Q	4 1/2 Q	20	83	
C5	Wau FK	4-3 1/2 x 4	CI	Top	20-600						Ch	C7	18mm						4	1 1/2 Q	2 Q	14		
C35, C35B, CS35, CS35B, C35T, CS35T, B4, C40, CS40, C40T, C40F	Own FAB3	6-3 1/2 x 4	CI	Bot	40-1400	10°A	3A	.024	.015	.015	AC	A8	7/8	K	D	5°B	1 1/2 B	Ad	7	4 1/2 Q	7 1/2 Q	20	93	
A4, A5, A6, C50, C50T	Own FBB	6-3 1/2 x 4 1/2	AI	Bot	40-1800	10°A	3 1/2 A	.016	.015	.015	AC	A8	7/8	K	D	10°B	3 1/2 B	Ad	10	5 1/2 Q	8 Q	28 1/2	76	
C55, C55F, C55T, C60, C60T	Own FBB3	6-3 1/2 x 4 1/2	AI	Top	40-1800	10°A	3 1/2 A	.016	.015	.015	AC	A8	7/8	K	D	10°B	3 1/2 B	Ad	9	5 1/2 Q	8 Q	29 1/2	80	
A7, A7F	Own FDB	6-4 1/2 x 5 1/2	CI	Bot	40-1800	10°A	4 1/2 A	.011	.011	.013	AC	A8	7/8	K	D	5°B	2 1/2 B	Ad	20	24 Q	12 Q	42	70	
A8	Own FEB	6-5 x 5 1/2	CI	Bot	40-1700	10°A	4 1/2 A	.011	.011	.013	AC	A8	7/8	K	D	5°B	2 1/2 B	Ad	20	24 Q	12 Q	42		
KENWORTH—																								
88, 89, 89SBT, 89SW, 90	Her JXC	6-3 1/2 x 4 1/2		Top	26-2600	5°A		.006	.006	.006	Ch	1 COM	7/8	.025	.020	TC		Re	6					
127	Her WXC	6-4 x 4 1/2		Top	26-2600	2°A		.010	.006	.010	Ch	1 COM	7/8	.025	.020	TC		Re	6					
128	Her WXC2	6-4 1/2 x 4 1/2		Top	26-2600	2°A		.010	.006	.010	Ch	1 COM	7/8	.025	.020	TC		Re	7					
146B	Bud K393	6-4 1/2 x 4 1/2																						
D146C	Cum HA4	4-4 1/2 x 6	Ch								Inj				Inj									
186	Her YXC2	6-4 1/2 x 4 1/2		Top	26-2600	2°A		.010	.006	.010	Ch	1 COM	7/8	.025	.020	TC		Fe	10					
241	Her RXB	6-4 1/2 x 5 1/2	AI	Top	26-2600	2°A		.010	.006	.010	Ch	1 COM	7/8	.025	.020	TC		Re	10					
241A	Ha 160	6-4 1/2 x 5 1/2	AI																					
D241C	Cum HA6	6-4 1/2 x 6	Ch																					
386C	Ha 175	6-5 x 6																						
D346C	Cum HA6	6-4 1/2 x 6	Ch																					
505, 506, 507, 508, 509	Cum HA4	4-4 1/2 x 6	Ch								Inj				Inj									
KLEIBER—80, 100, 81																								
120	Her JXB	6-3 1/2 x 4	AI	Top	26-2600	2°B	1B	.012	.012	.012	Ch	1 COM	18mm	7/8	.027	.020	TC	Re	6				81	
140	Con E601	6-3 1/2 x 4 1/2	CI	Top	40-2600	8°B	3B	.012	.012	.012	Ch	1 COM	18mm	7/8	.025	.020	8°B	Re	8				97	
210, 141	Her WXC	6-4 x 4 1/2	AI	Top	26-2600	2°A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020	TC	3B	Re	7				92	
121	Con E103	6-4 1/2 x 4 1/2	CI	Top	30-2300	5°B	2B	.014	.012	.015			18mm		.025	.020	15°B	Ad	10				82	
		6-4 1/2 x 4 1/2	CI	Top	40-2600	8°B	3B	.012	.007	.012			18mm		.025	.020	8°B	Ad	10				99	
LA FRANCE REPUBLIC—C3																								
D4	Wau 6BK	6-3 1/2 x 4 1/2	CI	Top	40-	TC	TC	.010	.006-.008	.010-.012	AC	D10	18mm	.025					8	3 Q	4 Q	22	112	
E4	Wau 6BK	6-3 1/2 x 4 1/2	CI	Top	40-	TC	TC	.010	.006-.008	.010-.012	AC	D10	18mm	.025					8	3 1/2 Q	4 Q	22	112	
F4	Wau 6BK	6-3 1/2 x 4 1/2	CI	Top	40-	TC	TC	.010	.006-.008	.010-.012	AC	D10	18mm	.025					8	4 Q	7 Q	22	112	
H6	Wau 6MK	6-4 1/2 x 4 1/2	CI	Top	40-	8°A		.004	.004-.006	.012-.014	AC	D10	18mm	.025					8	12 Q	7 1/2 Q	32	80	
K1	Wau 6MK	6-4 1/2 x 4 1/2	CI	Top	40-	8°A		.004	.004-.006	.012-.014	AC	D10	18mm	.025					8	12 Q	7 1/2 Q	32	80	
M4	Wau 6SRL	6-4 1/2 x 5 1/2	CI	Top	40-	10°A		.004	.006-.008	.016-.018	AC	L10	1 1/2	.025					10	6 Q	7 1/2 Q	36	80	
	Wau 6-125	6-4 1/2 x 5 1/2	AI	Top	40-	42°B		.010	.010-.012	.018-.020	AC	D8	1 1/2	.025					10	6 Q	9 Q	36	96	
MACK, JR.—1M																								
10M	MR 209	6-3 1/2 x 4 1/2	AI	Top	30-2000	2°B	1B	.012	.007	.008	Ch	C7	18mm	.025	.020	10°B	3B		5	2 L	2 L	15 1/2	85	
20M	MR 209	6-3 1/2 x 4 1/2	AI	Top	30-2000	2°B	1B	.012	.007	.008	Ch	C7	18mm	.025	.020	10°B	3B		5	6 L	9 L	19 1/2	85	
30M	MR 228	6-3 1/2 x 4 1/2	AI	Bot	40 Max.	5°B	2B	.012	.007	.008	Ch	C7	18mm	.025	.020	10°B	4B		6	6 L	9 L	19 1/2	85	
90M	MR 268	6-3 1/2 x 5	AI	Bot	40 Max.	TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020	10°B	4B		6	6 L	9 L	19 1/2	78	
90MS	MR	6-3 1/2 x	AI	Bot	40 Max.	TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020	10°B	4B		6	6 L	9 L	19 1/2	78	
	MR	6-3 1/2 x	AI	Bot	40 Max.	TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020	10°B	3 1/2 B		6	12 L	9 L	24	78	
MACK—BG-EC																								
BF-S.R., EB-S.R.	Own BG	6-3 1/2 x 5	Tp	Top	50-	6°A	2A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	10	11 Q	6 Q	27	89	
BF-D.R., EB-D.R.	Own CU	6-3 1/2 x 5	AI	Top	50-	6°A	2A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	10	11 Q	7 Q	31	90	
AB Chain	Own AB	4-4 1/2 x 5	Tp	Top	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	TC	TC	Mg	10	4 Q	6 Q	39	83	
AB-D.R.	Own AB	4-4 1/2 x 5	Tp	Top	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	TC	TC	Mg	10	4 Q	6 Q	39	83	
BM	Own CE	6-4 x 5 1/2	Tp	Bot	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	17	10 1/2 Q	8 Q	42	91	
CH	Own CE	6-4 x 5 1/2	Tp	Bot	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	17	8 Q	8 Q	44	91	
BX Chain	Own CF	6-4 1/2 x 5 1/2	Tp	Top	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	16	10 1/2 Q	6 Q	45	91	
BX-D.R.	Own CF	6-4 1/2 x 5 1/2	Tp	Top	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	16	10 1/2 Q	6 Q	45	91	
CJ	Own CF	6-4 1/2 x 5 1/2	Tp	Top	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	16	8 Q	8 Q	46	91	
BQ	Own BQ	6-4 1/2 x 5 1/2	Tp	Top	50-	10°A	4 1/2 A	.008	.008	.024	Ch	2	7/8	P	.025	TC	1B	Ad	16	14 Q	7 Q	52	84	
AK4	Own AC	6-4 1/2 x 5 1/2	Tp	Top	50-	10°A	4 1/2 A	.008	.008	.024	Ch	5	18mm	7/8	P	.025	TC	Mg	8	14 Q	7 Q	71	65	
AK6	Own BQ	6-4 1/2 x 5 1/2	Tp	Top	50-	10°A	4 1/2 A	.008	.008	.024	Ch	2	7/8	P	.025	TC	1B	Ad	16	14 Q	7 Q	90	84	
AC 4	Own AC	6-4 1/2 x 5 1/2	Tp	Top	30-	10°A	4 1/2 A	.008	.008	.024	Ch	5	18mm	7/8	P	.025	TC	Mg	8	F		71	65	
SIX WHEELERS																								
BX-2W.D.	Own CF	6-4 1/2 x 5 1/2	Tp	Top	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	16	10 1/2 Q	8 Q	45	91	
BX-4W.D.	Own CF	6-4 1/2 x 5 1/2	Tp	Top	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	16	10 1/2 Q	14 Q	45	91	
CJ-2W.D.	Own CF	6-4 1/2 x 5 1/2	Tp	Top	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	16	8 Q	8 Q	46	91	
CJ-4W.D.	Own CF	6-4 1/2 x 5 1/2	Tp	Top	35-	10°A	4A	.008	.008	.024	Ch	5	18mm	.025	.025	7°B	2 1/2 B	Ad	16	8 Q	14 Q	46	91	
BQ-2W.D.	Own BQ	6-4 1/2 x 5 1/2	Tp	Top	50-	10°A	4 1/2 A	.008	.008	.024	Ch	2	7/8	P	.025	TC	1B	Ad	16	14 Q	7 Q	52	84	
BQ-4W.D.	Own BQ	6-4 1/2 x 5 1/2	Tp	Top	50-	10°A	4 1/2 A	.008	.008	.024	Ch	2	7/8	P	.025	TC	1B	Ad	16	14 Q	14 Q	52	84	
MARMON-HERRINGTON—																								
A10-4	Her JXA	6-3 1/2 x 4 1/2		Top	26-2600	2°A	1A	.006	.006	.006	Ch	1 COM	7/8	.025	.020	TC	TC	Re	6	4 Q	8 Q	22	96	
A20-4	Her JXC	6-3 1/2 x 4 1/2		Top	26-2600	2°A	1A	.006	.00															

27

Cooling System Capacity (Qt.)	Comp. Pressure at Cranking Speed	TRUCK MAKE AND MODEL	Engine Make and Model	Number of Cylinders Bore and Stroke	Piston Material Connecting Rods Removed From	Normal Oil Pressure Lb. at M.P.H. or R.P.M.	Intake Valve Opens B-Before A-After	Intake Tappet Clearance for Valve Timing	OPERATING TAPPET CLEARANCE		SPARK PLUG			Breaker Point Gap	Spark Occurs °C B-Before A-After	Spark Occurs Flywheel Teeth °C B-Before A-After	Breaker Housing	LUBRICANT CAPACITY 0-Qt. L-Lb.			Cooling System Capacity (Qt.)	Comp. Pressure at Cranking Speed	
									Intake	Exhaust	Make	Type	Size					Gap	Engine	Transmission			Rear Axle
15 3/4	95	OSHKOSH—WLD—Cont.																					
17 1/2	72	B3S	Her WXC3	6-4 1/2 x 4 1/2	Al Top	26-2600 2"A		.006	.006	.010	Ch	1 COM	7/8	.025	.020		Re	7 23 1/2	L 10 L	28	95		
20	93	B3D	Her WXC3	6-4 1/2 x 4 1/2	Al Top	26-2600 2"A		.006	.006	.010	Ch	1 COM	7/8	.025	.020		Re	7 23 1/2	L 10 L	28	95		
14		C3S	Her YXC2	6-4 1/2 x 4 1/2	Al Top	26-2600 2"A		.006	.006	.010	Ch	1 COM	7/8	.025	.020		Re	7 23 1/2	L 10 L	28	95		
		C3D	Her YXC2	6-4 1/2 x 4 1/2	Al Top	26-2600 2"A		.006	.006	.010	Ch	1 COM	7/8	.025	.020		Re	7 23 1/2	L 10 L	28	95		
20	93	R3S	Her RXB	6-4 1/2 x 4 1/2	Al Top	26-2600 2"A		.006	.006	.010	Ch	1 COM	7/8	.025	.020		Re	7 23 1/2	L 10 L	28	95		
28 1/2	76	FD	Her RXCO	6-4 1/2 x 4 1/2	Al Top	26-2600 2"A		.006	.006	.010	Ch	1 COM	7/8	.025	.020		Re	7 23 1/2	L 10 L	28	95		
29 1/2	92	BG3	Her HXB	6-4 1/2 x 4 1/2	Al Top	26-2600 2"A		.006	.006	.010	Ch	1 COM	7/8	.025	.020		Re	7 23 1/2	L 10 L	28	95		
42	70	GD	Her HXE	6-5 x 6	Al Top	35-1600 5"B		.010	.010	.016	Ch	1 COM	7/8	.025	.020		Re	7 23 1/2	L 10 L	28	95		
		REO—1B4, 1D4	Own	6-3 1/2 x 5	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	80		
		1B, 1D	Own	6-3 1/2 x 5	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	80		
		2L, 2B, 2D	Own	6-3 1/2 x 5	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	80		
		2B4, 2D4, 2L4	Own	6-3 1/2 x 5	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	80		
		2H, 2J, 2K	Own	6-3 1/2 x 5	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	80		
		3H, 3J, 3K, 3M	Own	6-3 1/2 x 5	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	80		
		4H, 4J, 4K, 4M	Own	6-3 1/2 x 5	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	80		
		6AP (1936)	Own	6-3 1/2 x 5	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	80		
		1A4, 1C4 (1936)	Own	6-3 1/2 x 4 1/2	Al Bot	30-2000 2"B	3 1/2 B	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	5 2 L	15 L	25 1/2	80		
		1A4H, 1C4H, 1B4, 1D4, 2D4M (1936)	Own	6-3 1/2 x 4 1/2	Al Bot	30-2000 2"B	3 1/2 B	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	5 2 L	15 L	25 1/2	80		
		1B4H, 1D4H, 2D4MH, 2B4, 2D4, 2H5, 2J5 (1936)	Own	6-3 1/2 x 4 1/2	Al Bot	40 Max. 5"B		.012	.007	.008	Ch	C7	18mm	.025	.020 3"B	1B	Ad	5 6 L	9 L	15 1/2	85		
		3H5, 3J5, 3K5, 3HR5, 3JR5, 3KR5 (1936)	Own	6-3 1/2 x 5	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	85		
		4H5, 4J5, 4K5 (1936)	Bud K423	6-4 1/2 x 4 1/2	Al Bot	40 Max. TC	TC	.012	.007	.008	Ch	C7	18mm	.025	.020 10"B	4B	Ad	6 6 L	9 L	18 1/2	85		
81		SCHACHT—20H, 20HA, 25H, 25HA, 28H, 28HA	Her WXC	6-4 x 4 1/2	Top	26-2600 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
97		35H, 35HA, 35A	Her WXC2	6-4 1/2 x 4 1/2	Top	26-2600 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
92		40H, 40HA, 40HB, TRD, 40A	Her YXC	6-4 1/2 x 4 1/2	Top	26-2600 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
99		66H, 66HA, TRDB	Her RXC	6-4 1/2 x 4 1/2	Top	26-2600 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
112		TRDA	Her YXC3	6-4 1/2 x 4 1/2	Top	26-2600 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
112		10A, 12A (1936)	Her JXB	6-3 1/2 x 4 1/2	Top	26-2600 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
112		15A (1936)	Her JXC	6-3 1/2 x 4 1/2	Top	30-2400 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
80		18A (1936)	Her JXD	6-4 x 4 1/2	Top	30-2400 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
80		20A (1936)	Her JXD	6-4 x 4 1/2	Top	30-2400 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
80		25A (1936)	Her WXC2	6-4 1/2 x 4 1/2	Top	30-2400 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
80		28A (1936)	Her WXC3	6-4 1/2 x 4 1/2	Top	30-2400 2"A	1A	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 L	15 L	25 1/2	80		
81		STERLING—FB50 DeL.	Wau 6BK	6-3 1/2 x 4 1/2	CI Top	40- TC	TC	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 Q	7 1/2 Q	20	75		
85		FB60 DeL.	Wau 6BK	6-3 1/2 x 4 1/2	CI Top	40- TC	TC	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 Q	7 1/2 Q	20	75		
85		FB70 DeL.	Wau 6BK	6-3 1/2 x 4 1/2	CI Top	40- TC	TC	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 Q	7 1/2 Q	20	75		
85		FC90	Wau 6BK	6-3 1/2 x 4 1/2	CI Top	40- TC	TC	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 Q	7 1/2 Q	20	75		
85		FBT130	Wau 6BK	6-3 1/2 x 4 1/2	CI Top	40- TC	TC	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 Q	7 1/2 Q	20	75		
85		FB-80	Wau 6BK	6-3 1/2 x 4 1/2	CI Top	40- TC	TC	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 Q	7 1/2 Q	20	75		
85		FD90	Wau 6BK	6-3 1/2 x 4 1/2	CI Top	40- TC	TC	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 Q	7 1/2 Q	20	75		
89		FD97	Wau 6BK	6-3 1/2 x 4 1/2	CI Top	40- TC	TC	.010	.006	.010	Ch	1 COM	7/8	.025	.020 TC	TC	Re	7 12 Q	7 1/2 Q	20	75		
90		FC135	Wau 6SRL	6-4 1/2 x 4 1/2	CI Top	40- 8"A		.004	.004	.006	.010-012 AC	D10	18mm	.025			8 3 Q	4 Q	22	112			
90		HC140	Wau 6SRL	6-4 1/2 x 4 1/2	CI Top	40- 10"A		.004	.004	.006	.010-012 AC	D10	18mm	.025			8 4 Q	4 Q	22	112			
90		FD115	Wau 6SRL	6-4 1/2 x 4 1/2	CI Top	40- 10"A		.004	.004	.006	.010-012 AC	D10	18mm	.025			8 4 Q	4 Q	22	112			
90		FC100	Wau 6-125	6-4 1/2 x 4 1/2	CI Top	40- 10"A		.004	.004	.006	.010-012 AC	D10	18mm	.025			8 4 Q	4 Q	22	112			
91		FBT152	Wau 6MZ	6-4 1/2 x 4 1/2	CI Top	40- 10"A		.004	.004	.006	.010-012 AC	D10	18mm	.025			8 4 Q	4 Q	22	112			
91		HC170	Wau 6-110	6-4 1/2 x 4 1/2	CI Top	40- 8"A		.010	.010	.012	.010-012 AC	L10	7 1/2	.025			10 6 Q	7 1/2 Q	32	80			
91		HC210	Wau 6RB	6-4 1/2 x 4 1/2	CI Top	40- 15"B		.004	.004	.006	.010-012 AC	D8	18mm	.025			10 6 Q	7 1/2 Q	32	80			
91		STUDEBAKER—T2	Wau 6RB	6-4 1/2 x 4 1/2	CI Top	40- 10"A		.008	.004	.006	.010-012 AC	D8	18mm	.025			10 6 Q	7 1/2 Q	32	80			
91																							

TRUCK MAKE AND MODEL	Engine Make and Model	Number of Cylinders, Bore and Stroke	Piston Material	Connecting Rods Removed From	Normal Oil Pressure Lb. at M.P.H. or R.P.M.	Intake Valve Opens B-Before A-After		Intake Tappet Clearance for Valve Timing	OPERATING TAPPET CLEARANCE		SPARK PLUG				Breaker Point Gap	Spark Occurs °TC B-Before A-After	Spark Occurs Fly- Wheel Teeth °TC B-Before A-After	Breaker Housing	LUBRICANT CAPACITY Q-Qt. L-Lb.				Cooling System Capacity (Qt.)	Comp. Pressure at Cranking Speed	
						TC	Flywheel Teeth TC		Intake	Exhaust	Make	Type	Size	Gap					Engine	Trans- mission	Rear Axle				
CONTINENTAL—Cont.																									
	E601	6-37x4 1/2	CI	Top	40-2600	8°B	2 1/2	B	.012	.007H	.012H			18mm					8						97
	E602	6-41x4 1/2	CI	Top	40-2600	8°B	2 1/2	B	.012	.007H	.012H			18mm					8						102
	E603	6-41x4 1/2	CI	Top	40-2600	8°B	2 1/2	B	.012	.007H	.012H			18mm					8						99
	20R	6-41x4 3/8	AI	Top	30-2300	5°B	2B		.014	.012H	.015H			18mm					10						80
	21R	6-41x4 3/8	AI	Top	30-2300	5°B	2B		.014	.012H	.015H			18mm					10						78
	22R	6-41x5 1/2	AI	Top	30-2300	5°B	2B		.014	.012H	.015H			18mm					10						78
HERCULES																									
	JXA	6-37x4 1/2	Var	Top	26-2600	5°A	Var		.006	.006	.006	1	COM	7/8	.025	.020	TC	Var	Re	6					Opt
	JXB	6-37x4 1/2	Var	Top	26-2600	5°A	Var		.006	.006	.006	1	COM	7/8	.025	.020	TC	Var	Re	6					Opt
	JXC	6-37x4 1/2	Var	Top	26-2600	5°A	Var		.006	.006	.006	1	COM	7/8	.025	.020	TC	Var	Re	6					Opt
	JXD	6-4x4 1/2	Var	Top	26-2600	5°A	Var		.006	.006	.006	1	COM	7/8	.025	.020	TC	Var	Re	6					Opt
	WXC	6-4x4 1/2	Var	Top	26-2600	2°A	Var		.010	.006	.010	1	COM	7/8	.025	.020	TC	Var	Re	7					Opt
	WXC2	6-41x4 1/2	Var	Top	26-2600	2°A	Var		.010	.006	.010	1	COM	7/8	.025	.020	TC	Var	Re	7					Opt
	WXC3	6-41x4 1/2	Var	Top	26-2600	2°A	Var		.010	.006	.010	1	COM	7/8	.025	.020	TC	Var	Re	7					Opt
	YXC	6-41x4 3/8	Var	Top	26-2600	2°A	Var		.010	.006	.010	1	COM	7/8	.025	.020	TC	Var	Re	10					Opt
	YXC2	6-41x4 3/8	Var	Top	26-2600	2°A	Var		.010	.006	.010	1	COM	7/8	.025	.020	TC	Var	Re	10					Opt
	YXC3	6-41x4 3/8	Var	Top	26-2600	2°A	Var		.010	.006	.010	1	COM	7/8	.025	.020	TC	Var	Re	10					Opt
	RXB	6-41x5 1/2	AI	Top	26-2600	2°A	Var		.010	.006	.010	1	COM	7/8	.025	.020	TC	Var	Re	10					Opt
	RXC	6-41x5 1/2	AI	Top	26-2600	2°A	Var		.010	.006	.010	1	COM	7/8	.025	.020	TC	Var	Re	10					Opt
	HXB	6-5x6	AI	Top	35-1600	5°B	Var		.015	.010	.016	1	COM	7/8	.025	.020	TC	Var	Re	20					Opt
	HXC	6-51x6	AI	Top	35-1600	5°B	Var		.015	.010	.016	1	COM	7/8	.025	.020	TC	Var	Re	20					Opt
	HXD	6-51x6	AI	Top	35-1600	5°B	Var		.015	.010	.016	1	COM	7/8	.025	.020	TC	Var	Re	20					Opt
	HXE	6-51x6	Var	Top	35-1600	5°B	Var		.015	.010	.016	1	COM	7/8	.025	.020	TC	Var	Re	20					Opt
	QXA	6-37x4 1/2	Var	Top	26-2600	5°B	Var		.006	.006	.006	1	COM	7/8	.025	.020	TC	Var	Re	6					Opt
	QXB	6-37x4 1/2	Var	Top	26-2600	5°B	Var		.006	.006	.006	1	COM	7/8	.025	.020	TC	Var	Re	6					Opt
	1XA	4-3x4	Var	Top	15-1000	5°A	Var		.006	.006	.006	1	COM	7/8	.025	.020	TC	Var	Re	2					Opt
	1XB	4-3x4	Var	Top	15-1000	5°A	Var		.006	.006	.006	1	COM	7/8	.025	.020	TC	Var	Re	2					Opt
	OOA	4-31x4 1/2	Var	Top	16-1100	5°A	Var		.008	.008	.012	1	OM	7/8	.025	.020	TC	Var	Re	4					Opt
	OOB	4-31x4 1/2	Var	Top	16-1100	5°A	Var		.008	.008	.012	1	COM	7/8	.025	.020	TC	Var	Re	4					Opt
	OOB	4-31x4 1/2	Var	Top	16-1100	5°A	Var		.008	.008	.012	1	COM	7/8	.025	.020	TC	Var	Re	4					Opt
	DJXB	6-37x4 1/2	AI	Top	40-2000	12°B	Var		.010	.010	.016		INJ						10						Opt
	DJXC	6-37x4 1/2	AI	Top	40-2000	12°B	Var		.010	.010	.016		INJ						10						Opt
	DRXB	6-41x5 1/2	AI	Top	26-1200	12°B	Var		.010	.010	.016		INJ						10						Opt
	DHXB	6-5x6	AI	Top	35-1600	5°B	Var		.010	.010	.016		INJ						20						Opt
LYCOMING—(1929-32)																									
	CT	4-3 1/2x5	CI	Bot	40 Max.	TC	TC		.008	.006-.008	.006-.008			7/8	.025	.018			5						
	C4	4-4x5	CI	Bot	40 Max.	TC	TC		.008	.006-.008	.006-.008			7/8	.025	.018			5						
	(1929) on	4-4x5	CI	Bot	40 Max.	TC	TC		.008	.006-.008	.006-.008			7/8	.025	.018			5						
	(1929)	6-2 1/2x4 1/2	As	Bot	40 Max.	TC	TC		.010	.006-.008	.006-.008			7/8	.025	.018			6						
	(1930-31)	6-2 1/2x4 3/8	As	Bot	40 Max.	5°B	1 1/2	B	.010	.006-.008	.006-.008			7/8	.025	.018			6						
	(1931-32)	6-3x4 1/2	CI	Bot	40 Max.	5°B	1 1/2	B	.010	.006-.008	.006-.008			7/8	.025	.018			6						
	(1929-31)	6-3 1/2x4 1/2	CI	Bot	40 Max.	5°A	1 1/2	A	.010	.006-.008	.010-.012			7/8	.025	.018			6						
	(1932) on	6-3 1/2x4 1/2	CI	Bot	40 Max.	5°A	1 1/2	A	.010	.006-.008	.010-.012			7/8	.025	.018			6						
	(1932) on	6-3 1/2x4 1/2	CI	Bot	40 Max.	5°A	1 1/2	A	.010	.006-.008	.010-.012			7/8	.025	.018			6						
	(1933)	6-3 1/2x4 1/2	CI	Bot	40 Max.	5°A	1 1/2	A	.010	.006-.008	.010-.012			7/8	.025	.018			6						
	(1929-31)	6-3 1/2x5	AI	Bot	40 Max.	5°A	1 1/2	A	.010	.006-.008	.010-.012			7/8	.025	.018			8						
	(1930-33)	6-3 1/2x5	AI	Top	40 Max.	5°A	1 1/2	A	.010	.006-.008	.010-.012			7/8	.025	.018			8						
	(1929-34)	6-3 1/2x5	CI	Top	40 Max.	5°A	1 1/2	A	.010	.006-.008	.010-.012			7/8	.025	.018			8						
	(1930-32)	8-3 1/2x4 1/2	CI	Top	40 Max.	5°B	1 1/2	B	.012	.008-.010	.010-.012			18mm	.025	.018			9						
	(1930-32)	8-3 1/2x4 1/2	CI	Top	40 Max.	5°B	1 1/2	B	.012	.008-.010	.010-.012			18mm	.025	.018			9						
	(1933) on	8-3 1/2x4 1/2	CI	Top	40 Max.	5°B	1 1/2	B	.012	.008-.010	.010-.012			18mm	.025	.018			11						
	(1930)	6-3 1/2x4 1/2	CI	Top	40 Max.	5°A	1 1/2	A	.012	.008-.010	.010-.012			18mm	.025	.018			7						
	(1930-33)	6-3 1/2x4 1/2	CI	Top	40 Max.	5°A	1 1/2	A	.012	.008-.010	.010-.012			18mm	.025	.018			7						
	(1930-33)	6-3 1/2x4 1/2	CI	Top	40 Max.	5°A	1 1/2	A	.012	.008-.010	.010-.012			18mm	.025	.018			7						
	(1934) on	6-3 1/2x4 1/2	CI	Bot	40 Max.	5°A	1 1/2	A	.012	.008-.010	.010-.012			18mm	.025	.018			7						
	(1930) on	4-3 1/2x4 1/2	CI	Bot	40 Max.	TC	TC		.008	.006-.008	.006-.008			7/8	.025	.018			5						
	(1931) on	8-3 1/2x4 1/2	CI	Bot	40 Max.	5°B	1 1/2	B	.012	.008-.010	.008-.010			18mm	.025	.018			8						
	(1934) on	8-3 1/2x4 1/2	AI	Bot	40 Max.	7 1/2°B	2 1/2	B	.012	.008-.010	.008-.010			18mm	.025	.018			8						
	(1934) on	6-3 1/2x4 1/2	AI	Bot	40 Max.	7 1/2°B	2 1/2	B	.012	.008-.010	.008-.010			14mm	.025	.018			6						
WAUKESHA																									
	6BK	6-37x4 1/2	CI	Top	40-1500	TC	TC		.010	.012-.014	.012-.014			18mm	.025				8						112
	6MS	6-37x4 3/8	CI	Top	40-1500	8°A			.004	.003-.010	.012-.014			18mm	.025				8						86
	6ML	6-4x4 1/2	CI	Top	40-1500	8°A			.004	.008-.010	.014-.016			18mm	.025				8						89
	6MK	6-41x4 3/8	CI	Top	40-1500	8°A			.004	.008-.010	.014-.016			18mm	.025				8						80
	6MZ	6-41x4 3/8	CI	Top	40-1500	8°A			.004	.008-.010	.014-.016			18mm	.025				8						80
	6SRL	6-41x5 1/2	CI	Top	40-1500	10°A			.004	.008-.010	.016-.018			7/8	.025										

By RALPH L. WOODS, Industrial Traffic Specialist



A Shipper Gives Rates The THIRD DEGREE

A FELLOW would have to be pretty bumptious to plunge into a discussion of the new trucking rates without qualms and misgivings. The writer is no exception. After all, about 50,000 tariffs have been filed with the I. C. C. since the latter part of March. Nobody has dared guess how many rates these tariffs contain. Certainly no one person, or even group of persons, has had time to pore through them, and to compare the rates they contain one with another, and all of them with railroad rates. The very thought of such a task is terrifying. Anyway, by the time the job could be finished it would have to be done all over again since truck tariff supplements are already coming along thick and fast.

This is merely a wordy way of saying that the present discussion does not pretend to be a survey of the whole trucking rate set-up. Rather, it is simply one man's impressions, based on daily work with and special studies of the new rates, and backed by long experience in industrial traffic work. Of course, this does not mean that any time is going to be wasted on literary shadow-boxing or platitudinous rot. It is intended that these comments shall be as specific, frank, and terse as the circumstances suggest.

Suppose we first look over the

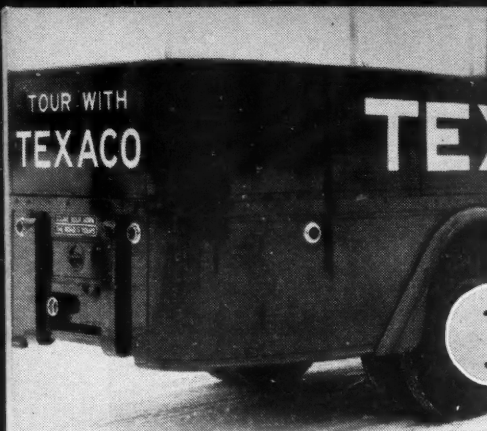
Keeshin Motor rates. Not just because the writer has had occasion to examine them carefully. But principally because Keeshin has attacked the vital problem of rate structure independent of the other truckers, and because their rates have a different relationship to railroad rates than the general run of motor carriers. Thus, we shall be able to gage the kind and extent of competition Keeshin is levelling at the railroads, and at the same time estimate the difference between Keeshin's rates and those of competing carriers.

Before any conclusions are drawn it might be well to indicate upon what they are based. In the first place, the

writer checked Keeshin's rates on 40 different movements. An effort was made to make this statement of rates representative in so far as geography, traffic flows, and length of hauls are concerned. (This comparative rate table is shown elsewhere. Beneath each Keeshin rate shown on the table is the railroad rate for the same class with the difference between each Keeshin rate and its competing rail rate.

In every one of the 40 movements checked, Keeshin's first, second, and third class rates were less than the same class rates via rail. The minimum differential via Keeshin was 1

(TURN TO PAGE 46, PLEASE)



1. WHEN Brockway had the problem of building a body with dust and waterproof compartments, Hansen was called upon to supply the locks and flush-type door handles. Locks have an interlocking mechanism at the center. Note the guard rail around the body and the upright guard arms in rear.



2. FEDERAL placed this streamlined 2-2½ ton Model 18 job in service for the United States Plywood Co. Cab and body are Federal built. Chassis accommodates a 12-ft. body. The body is lined with plywood inside and metal panels outside. A chromium plate railing around the top, beaver tail rear and drop skirt are body features.

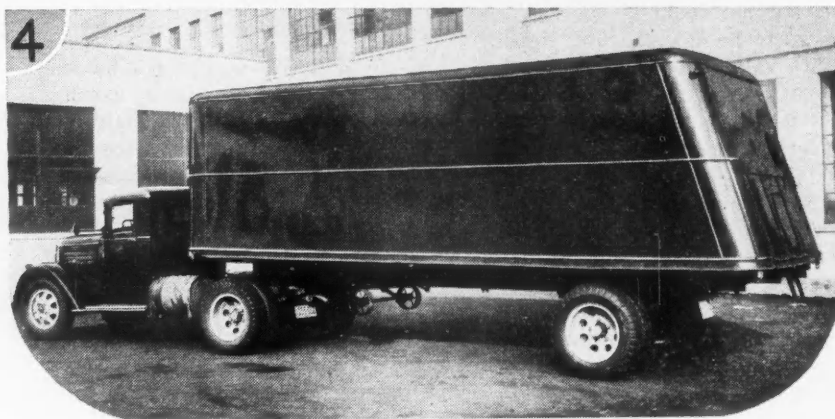
The ALBUM

Of Modern Truck Transportation Equipment

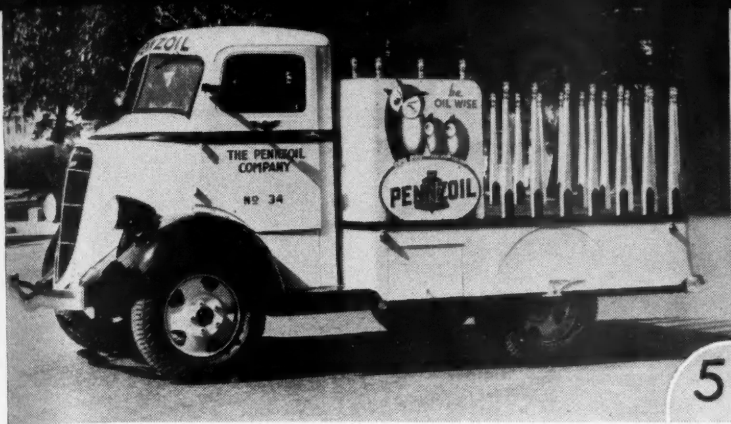
3. THIS Ford tank job is a "sweet torpedo." The tank trailer is hitched to a 2-ton de luxe tractor and has a capacity of 2500 gal. Gross weight is 17 tons. Tractor is a six-wheel, tandem drive. Trailer has twin axles. Frame construction of trailer is integral part of tank itself. This installation is known as the Butler tank.



4. THIS GMT tractor has a big hauling job on its hands, but the bigger they come the easier they roll (or something to that effect) for GMT. Note construction of the rear of the trailer body with its flush-type tailgate. Trailer is also GMT.



5. THE Pennzoil Co. goes Studebaker cab-forward with an unusually attractive stake body job. Body was built by Wm. B. Gibson and is 9 ft. long and 7 ft. wide. Hardwood stakes are natural-wood finish, and a chromium-plated owl sits at the top of each stake.



56

6. FRUEHAUF and AUTOCAR are at it again. This time it is the beautiful job operated by Circle Produce Co. Trailer is a special drop frame, and the capacity of the unit is 25,000 lb. The insulated body measures 22 ft. 1 in. by 8 ft. inside. Note ventilators in the nose of the trailer. The de luxe equipped Autocar tractor speaks for itself.

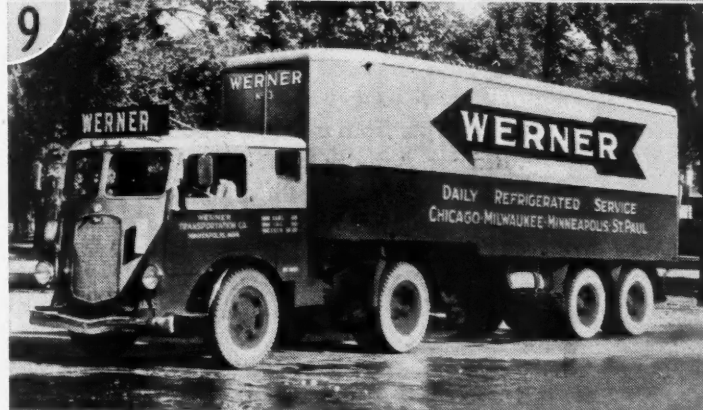
7. TRUCKTOR to HEIL to WHITE is the play that put out this swell Shell job. The third axle Trucktor unit is Model HLL. Tank is Heil built and contains six compartments with a total capacity of 1800 gal. White truck chassis is a Model 704K.

8. THERE are no grounds for beefing about this handsome Dodge truck operated by the Tejon Beef and Provision Co. The body is a special 1½-ton, open-express type of steel body. This unit operates on a 200-mile-a-day schedule.

9. DRY-ZERO insulation in this semi-trailer body built by the Hoiby Body Co. makes it possible for perishables to be hauled by the Mack tractor through weather that ranges from 30 deg. below zero to 100 above. Mack-International built the trailer. The unit is refrigerated by a brine tank and has 2 in. of insulation in the roof, sides and ends, and 2 in. of cork in the floor. Body is of oak frame and aluminum panels. Werner Transportation Co. does the big butter and egg hauling. Note reflector studded name.

10. HIGHWAY Trailer makes milk hauling all peaches and cream for Dakota Condensing Co. with this 77 series trailer chassis. Body is a Model 605 with Dry-Zero insulation and veneer lining. Rear end has double doors of 72-in. opening. The Chevrolet tractor makes the daily 90-mile run without even working up a sweat.

11. AN INTERNATIONAL truck chassis is under this unusual furniture body built by the General Body Mfg. Co. Body features low loading height. Note that the minimum of upright supports are used. Camel-back cab is wide and permits clear vision all around. John Smyth, the operator, uses a tarpaulin in bad weather, of course.



11 10



By

GEORGE T. HOOK

Editor, Commercial Car Journal



The Effects of **LEGISLATION** on *Design* TRUCK

(Excerpts from a Paper Sponsored by the Truck, Bus and Railcar Activity of the Society of Automotive Engineers and Presented at the Summer Meeting at White Sulphur Springs, June 1, 1936)

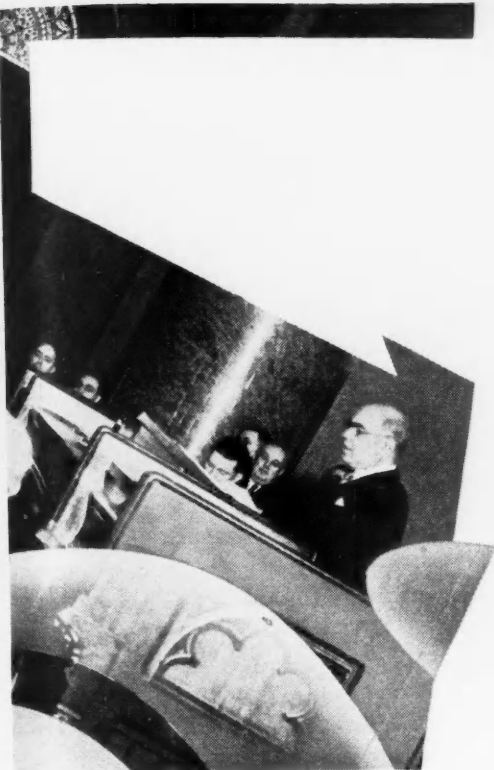
THERE is no doubt that legislation has had a very decided effect on the development of motor truck design in this country. The inconsistencies of legislation within states and the lack of uniformity among states have placed many unwarranted burdens on operators and designing engineers which unquestionably have resulted in an enormous economic waste.

The unwillingness of legislators to be guided by engineering principles and to accept the advice of well-informed engineering and administrative groups is an indication that they are not motivated by facts or fairness.

In too many instances the instigators of restrictive legislation have been the railroads. They have been weeping on the public's shoulder for years, and have been able to hold the public's attention because their hands are deep in the public's pockets. The sympathy they aroused was not based on reason but on cupidity and there can be no doubt that this sympathy has had its effect in state legislatures. The restrictive measures originating with the railroad lobbies were intended primarily to reduce the payload capacities in order to raise the cost of truck service and protect their own high tariffs. That

their regulatory efforts have not forced freight traffic back to the rails and have not made the truck an economic cripple is due chiefly to the resourcefulness and ingenuity of truck designing engineers. To them the solving of knotty operating problems arising from legislative requirements has been a daily chore for years. Many a slide rule has been tossed on a desk in utter disgust only to be picked up later and the problem solved, frequently to the engineer's own well-concealed amazement.

LEGISLATION has had an effect on truck design by the restrictions imposed on lengths, widths, axle weights and gross weights. Further effects may be anticipated in the growing tendency to increase the severity of braking requirements and in the disposition of safety fanatics to impose performance requirements of a stringent nature.



In surveying the effects of legislation on design I have availed myself of the practical experiences and the opinions of truck, trailer and axle engineers and of fleet operators.

In evaluating some of the more obvious effects of legislation on design we will first consider length limitations. There can be no doubt that laws cutting single unit lengths to 26, 26½, 27 and 28 ft., and tractor-semi-trailer lengths to 30, 33 and 35 ft., plus the fear that other states may follow suit, has been largely responsible for the modern reincarnation of the camel-back type of design, variously known as engine-under-the-seat, engine-between-seats, cab-over-the-engine, traffic-type and forward-drive.

While there is much legislation that has had an unfavorable effect on design, the length limitations have furnished the initial stimulus for a design—the camel-back—which has decided virtues. And I am not alone in the belief that legislation or no legislation the camel-back represents a style trend which is gaining momentum daily and which soon may find its way into the light truck field as standard production.

The evidence which I have gathered from engineers and operators themselves indicates that, so far as camel-backs are concerned, the legislative effect has not been an undesirable one. However, the design itself presents its own problems, which apparently are being solved satisfactorily. Here is some of the evidence:

LENGTH LIMITATIONS

A—Camel-Back Designs

FOR a given overall length an increase of approximately 3 ft. in actual loading space on a single unit truck is gained by the camel-back type.

The shorter wheelbase and reduced overall length improve maneuverability and the vehicle may be parked, unloaded and garaged and turned about in a smaller space.

The cost is about 10 to 15 per cent greater today but production in greater quantities should bring the price down closer to that of conventional types.

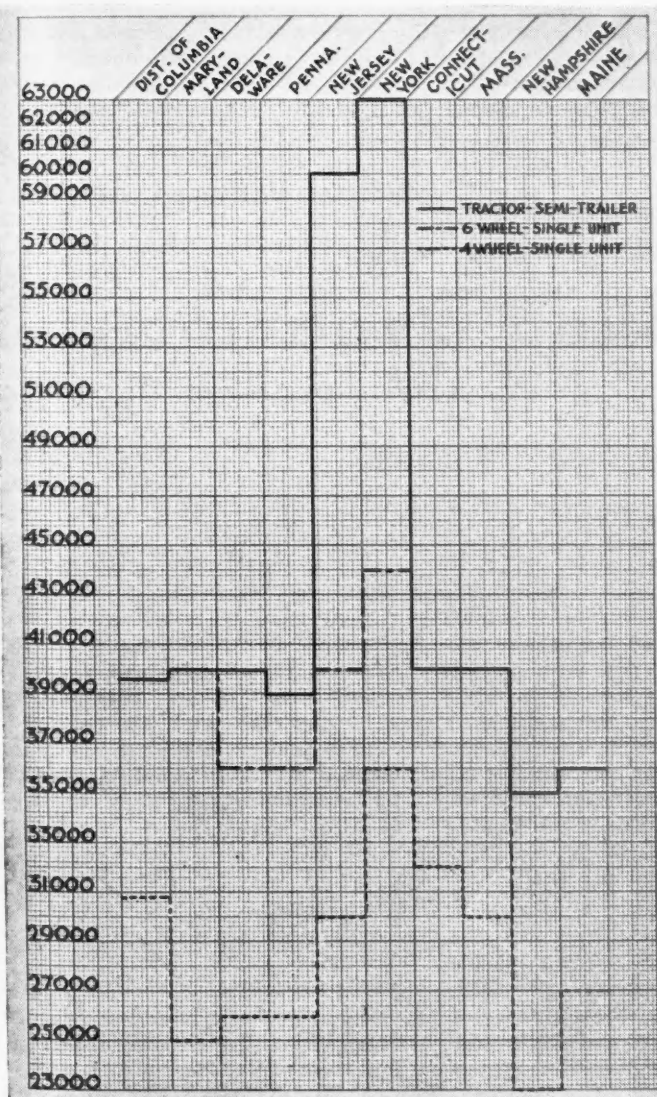
In a combination of vehicles inside the 45-ft. length limitation, the 3-ft. gain in load space is important in obtaining practical body lengths.

The camel-back type construction is the ideal method of securing ideal 1/3-2/3 weight distribution. This distribution can, of course, be obtained with conventional models and with set-back axle models but these fall short of the ideal.

The increase in payload capacity over the conventional type is approximately 10 per cent.

Turning radius is reduced in direct proportion to the reduction in wheel-

(TURN TO PAGE 88, PLEASE)



Left—Chart showing the inconsistencies of gross weight limitations of various states and the effect on operation of semi-trailers, six wheel single units and four-wheel single units. When an operator moves out of his home state he either suffers a penalty or, because of his home state's law, is unable to take advantage of another state's greater appreciation of highway transportation, which is also a penalty. Above—View of a state legislature in session (1936).

Studebaker Makes HILL-HOLDER Available On Trucks

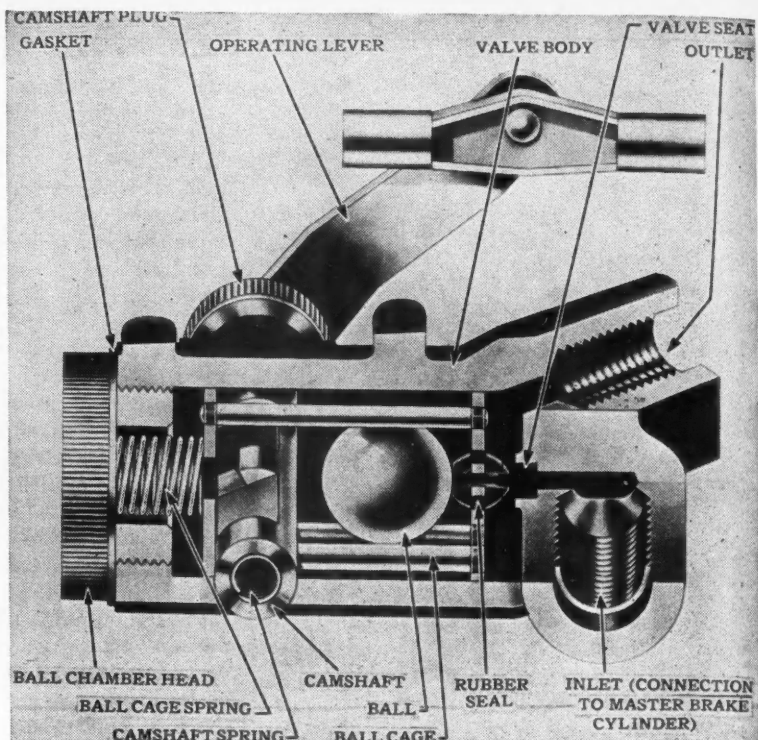
THE automatic hill-holder, pioneered by Studebaker for passenger cars, is now available on six Studebaker bus and truck models. The hill-holder device will be available on the 1½-ton Ace (2T2 and 2M2), the 2-ton Boss (2W6 and 2M6) and the bus chassis (2TB2 and 2MB2) models. It may be secured on both conventional and cab-forward models.

The hill-holder permits a driver to keep his truck stopped when it is facing up an incline without using his right foot on the brake pedal. This enables him to use his right foot upon the accelerator and he is assured of starting up the hill without stalling his engine, and most important of all the hill-holder absolutely prevents the truck rolling back down the hill.

Actually, the hill-holder is an automatic device, located in the hydraulic brake line, that maintains the brake pedal pressure without continued pressure on the pedal as long as the clutch

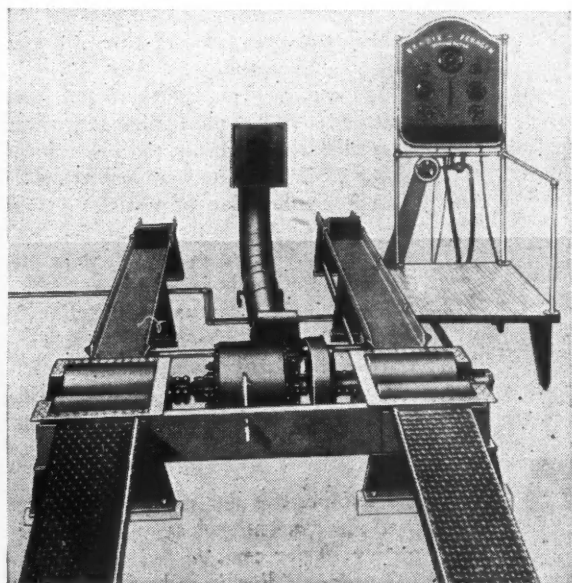
pedal is kept in a depressed position.

When the driver desires to continue up the hill, he gradually releases the clutch and depresses the accelerator.



Cutaway view of the Studebaker Hill-holder

The released clutch, releases the brakes and the vehicle moves forward. The hill-holder does not function on level ground or facing a down grade.



Bendix-Feragen dynamometer available for shops

A NEW chassis dynamometer, which enables service stations to offer "proving ground" tune-ups is announced by The Bendix Products Corp.

The Bendix-Feragen chassis dynamometer uses water as resistance as well as a coolant. Most units heretofore

The new dynamometer is designed in four sizes. They are designated by the weights of rear axles they are capable of supporting. The heavy duty model, which is the largest unit, is constructed only in the pit type, and has a rear axle capacity of 30,000 lb. Horse-power

Shop Dynamometer Uses Water As Resistance

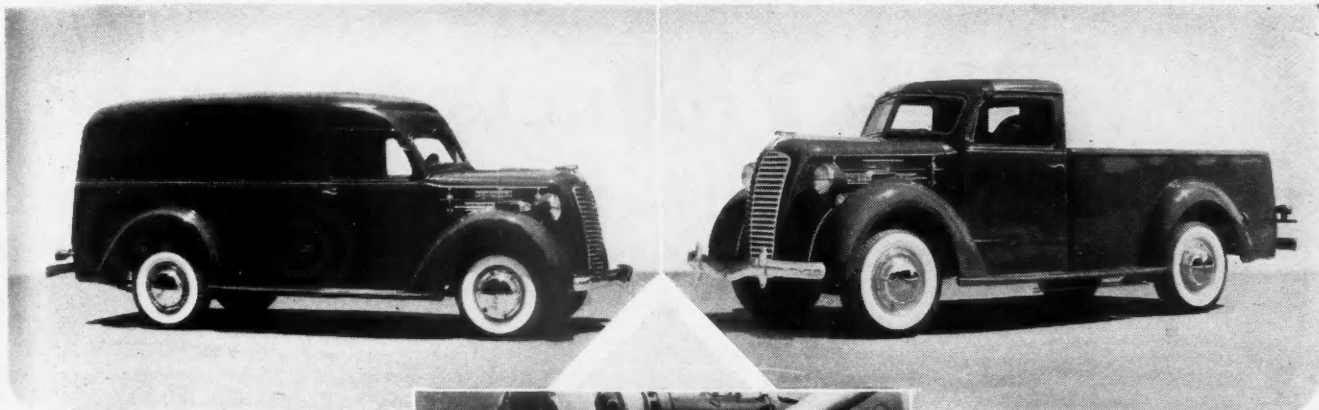
required a rotor speed of from 1200 r.p.m. and up in order to give any great amount of horse-power resistance. The Bendix-Feragen unit peaks at 750 r.p.m., which is approximately 20 or 25 m.p.h. on the average vehicle. It is possible with the Bendix-Feragen unit to run a 16-cylinder Cadillac in high gear, with the throttle wide open, at a speed of 15 miles per hour.

resistance and top speed are both practically unlimited.

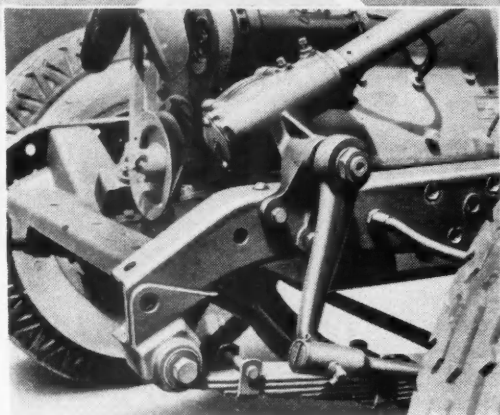
The universal model, in both floor mount and pit types, has a rear-axle capacity of 10,000 lb. and a horse-power resistance of 250, with top speed practically unlimited. This type of machine would handle the average 5-ton truck as well as the lightest automobile.

The standard model has a rear-axle capacity of 3700 lb., a resistance of 150 hp., and a top speed of 80 m.p.h. Built-in pit and floor mounts are available.

The junior model has a rear-axle capacity of 2000 lb., a horse-power resistance of approximately 100 hp., and a top speed of 60 m.p.h. Pit and floor mounts are available. Instrument panels are furnished with all of these various models, in several designs, but do not include any electrical units to go with them.



Above—Showing the panel and the 8-ft. pick-up express bodies on the new $\frac{3}{4}$ -ton. Note cab designs and de luxe front-ends



Left—Close-up of the Ross cam-and-lever steering gear, with cam-follower mounted in roller bearings, giving easy steering.

A NEW delivery truck of $\frac{3}{4}$ -ton capacity known as Model 80 has been announced by the Diamond T Motor Car Co., Chicago. This model, while similar in general appearance to the larger Diamond T trucks, represents fresh engineering and designing throughout the chassis, cab and bodies. Wheelbase is 119 in. Base price for the standard chassis is \$525.

Operating economy of the new Model 80 is indicated by a series of tests conducted with a fully loaded truck under actual traffic conditions. On comparatively long runs, with infrequent stops, in normal suburban and country highway traffic, 20 and 21 miles per gal. were consistently recorded. Further test runs in congested metropolitan traffic (on Chicago streets), gave the following readings on a standard Ohmer Tachograph: The truck covered 112 miles, making 125 stops. It was on the street approximately 8 hr. out of which time it was standing still with the engine idling a total of 3 hr. and 32 min. Under these conditions, the average mileage was 12.4 m.p.g. of gasoline.

The tests further indicated that the unusual economy has not required any sacrifice of acceleration or top speed. Sixty miles an hour was readily obtainable with full load. Among the features of Model 80 is a new type of X-frame construction, under-slung rear springs of the "progressive" type, and an unusually short turning radius. Six-in. side-rails are reinforced by straight X-sections of 8-in. maximum depth and

by three additional cross members, including an extra wide steel tank support of special design. A new Hercules six-cylinder, seven-bearing, heavy-duty engine of $3\frac{1}{8}$ -in. bore and $4\frac{1}{8}$ -in. stroke provides exceptional economy of maintenance as well as operation. Eight-ft. bodies of modern, streamlined design, in panel and pick-up styles are available.

The six-cylinder powerplant was developed especially for truck service. Piston displacement is 190 cu. in. and the AMA rating is 23.44 hp. The engine is of the L-head design. The $2\frac{1}{2}$ -in. crankshaft is carried in seven large main bearings having a total area of 79 sq. in. Force-feed lubrication is used on main and connecting rod bearings.

Diamond T $\frac{3}{4}$ -Ton \$525

**Model 80 Has Economical Six-Cylinder
190 cu. in. Engine; Wheelbase is 119 in.**

Water jackets extend the full length of the cylinders and surround the exhaust valves and guides. This feature provides a large margin of cooling safety. Camshaft and water pump are driven by wide-faced front-end gear train.

Model 80 is equipped with the newest type of Lockheed internal expanding hydraulic brakes. The cast iron brake drums are 14 in. in diameter and 2 in. wide. Take-up for lining wear is accomplished by a simple cam adjustment. The hand brake is a contracting band mounted at the rear of the transmission.

A full-floating spiral bevel rear axle is employed. Double Timken roller bearings at wheels center directly above the tires. Pinion gear is straddle-mounted. Standard axle ratio is 4.5 to 1, a 5.1 to 1 optional ratio being also available. Three speeds forward and one reverse are provided with Synchromesh second and high speeds.

STEERING gear is the latest type Ross cam and lever, with ball bearings in steering head and roller-bearing mounted cam-follower. Gasoline capacity is 18 gal. with tank die-formed and welded into one piece. Radiator is streamlined shell with decorative grille. Tires are 6.00/16" balloon, with semi drop-center rims. Larger tires are available at extra cost. Wheels are of the one-piece metal spoke type.

Two types of cabs are available, one known as the standard model and the other the De Luxe. De Luxe equipment is available on this model.

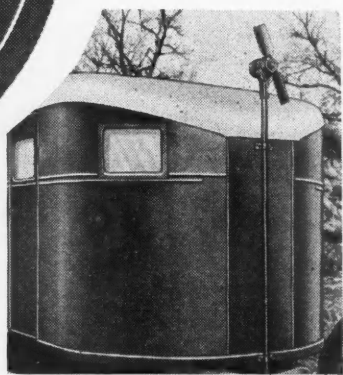


New Products on Parade

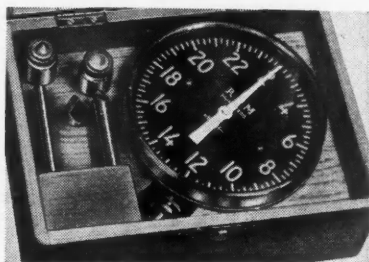
Descriptions of the Latest Items Put on the Truck Market by Equipment and Specialty Manufacturers

Hi-Way Charger

AN AUXILIARY battery charging unit has recently been announced by the Win-charger Corp., Sioux City, Iowa. Called the Hi-Way wincharger, is designed for use on trucks, camp trailers or semi-trailers. As shown in the illustrations, a specially designed generator is driven by a metal propeller. This unit begins charging at a road speed of about 22 miles per hour and reaches its maximum charging rate of 20 amperes at about 40-45 m.p.h.



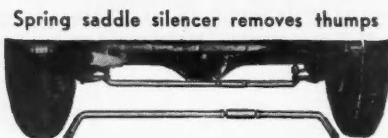
Hi-Way wincharger for trucks



Jones tachometer for use anywhere

Jones Tachometer

THE Jones Hand Tachometer is an extremely accurate and dependable instrument. It can be used anywhere that it is desired to determine speeds or changes in speed in r.p.m. It comes complete with the contact tips and extension arm so that it can be used at the starting jaw of an automotive engine. Accessories and instrument are packed in a carrying case. It is made by the Jones Motrola Sales Co., 370 Gerard Ave., New York City.



Spring saddle silencer removes thumps

NRG Lubricant

NRG is a concentrated lubricant which when added to the usual lubricating oil increases its efficiency and, when applied to motors and machinery, it reduces internal friction by a large percentage. It also removes and prevents the accumulation of carbon in internal combustion engines. It is made with a natural refined graphite in colloidal form. It can be used as a break in oil and also for continuous operation. Dynamic Research Corp. 360 Furman St., Brooklyn, New York.

Q-Seal(ing) Compound

Q-SEAL joint-sealing compound is used for sealing gasket, metal-to-metal, thread and flanged joints. It may also be used to seal crankcase, differential, carburetor, manifold and all other joints, leaving them clean and leakproof. It is insoluble in oil and gasoline, expands under heat and is not affected by vibration, the manufacturer claims. Quigley Co., 56 W. 46th St., New York.

Spring Saddle Silencer

THE Curtiss & Smith Mfg. Corp., Pottstown, Pa., announces a new appliance that is said to take out the thumps and rumbles from floating spring seats. Furnished in only one size for all models, it is claimed that it can be attached in 15 minutes.

Weldmaster Torch

THE Modern Engineering Co., St. Louis, is in production on the new Weldmaster light-weight welding torch. This torch with a standard tip weighs only 17½ oz. A new alloy that can be forged, extruded and heat treated and has a tensile strength of mild steel is used in the construction.

The circle mixer employed in all Meco torches has been improved and its capacity increased. Even the largest tips may be used efficiently with low gas pressures, as when working from medium acetylene generators. A new method of boring passages to rifle smoothness has been developed in this torch. Weldmaster torches are made in two types, the Standard, with

four tips, at \$24.75, and the Super, with six tips, at \$33.75.

Power Brake Control

BERG BROS. MFG. CO. has developed a new reactionary control for truck power brakes which enables the driver to control his brakes just as accurately as foot brakes, with the added safety and advantages of vacuum power. This reactionary control mechanism, by a simple mechanical principle, automatically builds up a slight resistance against the foot pedal by the same power that operates the brakes and in exact proportion to the force exerted on the brakes.

List price is \$18 for this type of brake for trucks up to 3-ton payload capacity. Berg. Bros. Mfg. Co., 4520 W. North Ave., Chicago.

Fuhrman Fifth Wheel

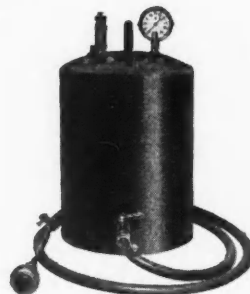
THE new power-transmitting fifth wheel made by the Fuhrman Trailer Co., 2006 Allen Ave., Southeast, Canton, Ohio, is completely enclosed. It consists briefly of a two-faced ring gear which has its bearing on the upper part of the king pin on the trailer half of the fifth wheel with a pinion gear mounted to transmit the power from the ring gear to the trailer unit.

The lower or tractor half of the fifth wheel has a pinion gear which is connected to the power take-off on the tractor transmission and this gear is connected with the hook which locks the pin to the lower fifth wheel in such a manner that when the hook is engaged the gears are automatically out of mesh.

Hydraulic Brake Tool

A BLEEDER tank and Master Cylinder filler for hydraulic brake work has been

announced by Curtiss & Smith Mfg. Corp., Pottstown, Pa. It is said to be of 2-gal. capacity, and equipped with safety valve, pressure gage, standard air valve, filler plug, long hose and easily attached master cylinder con-



Bleeder tank

nections to fit all cars. Price complete \$15 Truck attachments \$2 extra.

Only **BENDIX** provides everything **POWER BRAKING** can offer!

GENUINE Bendix B-K Controlled Vacuum Power Braking sells for very little more money than the cheapest substitute.

Entirely apart from fine, strong, precision construction—the actual *mechanical quality* of the unit—there are exactly one dozen vitally important features which Bendix Power Braking provides. No other make or type of supplementary stopping equipment duplicates these advantages.

You want *every* one of them. Don't let a dollar or so of purely theoretical "saving" keep you from getting the enduring protection, the nation-wide quick-action maintenance service, and the matchless performance which *only* Bendix B-K Controlled Vacuum Power Braking can offer.

Controlled Vacuum, by the way, is first and foremost—far and away—the most important of the twelve big Bendix B-K advantages. It's unduplicated. With it, the driver always knows, because his foot always *feels*, exactly how much power he's putting back of his pedal. He stops precisely as quickly as he wishes to stop . . . never more quickly.

Write for the complete, detailed facts about Power Braking, and you will choose as 96% of all users have chosen, Bendix Power Braking.

BENDIX PRODUCTS CORPORATION

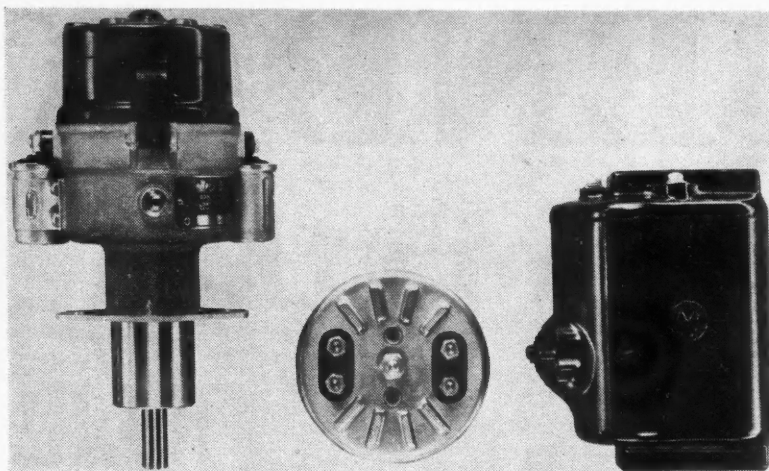
(Subsidiary of Bendix Aviation Corporation)

401 Bendix Drive, South Bend, Indiana



**PLUS
A NATION-WIDE
EXCHANGE SERVICE!**

- ★ Fully Controlled Power Application
- ★ Least Weight Added
- ★ Fewest Added Parts
- ★ Low First Cost
- ★ Practically No Maintenance
- ★ Instant Remote Control
- ★ All Emergency Features of Train Operation
- ★ Quickly Installed
- ★ Original Brake System Left Intact
- ★ A Nation-Wide Exchange Plan
- ★ A Nation-Wide Service Organization
- ★ Years of Power Braking Experience and Unapproached Protection Over Future Years of Service.



Detailed parts of the Mallory ignition system

New Mallory Ignition System Has Hot Spark

A SPECIAL ignition for heavy-duty oil-burning engines and for engines using low grade fuels, has been placed on the market by the Mallory Electric Corp., Detroit. The system already has been adopted as regular

equipment on engines of moderate compression ratio in which fuel is supplied by means of an injection system.

The ignition unit is said to produce the hottest spark ever available for the purpose and its advantages lie not only

in the ability to fire any kind of combustible mixture rapidly and unfailingly but also in promoting better low speed idling through the ability to burn fuel cleanly at low speed.

The system is also recommended for heavy-duty engine burning low grade fuels since the character of the spark has been proved to be most efficient in promoting combustion and in keeping the spark plugs clean regardless of the quality of the fuel.

An interesting variation in the system is the design of a horizontal distributor mounting for replacing magneto installations. Wide spark contacts are used and the entire head mechanism is provided with seals against the entrance of air, dust, and moisture. Due to the air-tight construction, the head chamber is vented by means of a suction line connected to the air cleaner inlet, this arrangement being essential in protecting the contact points and other metallic elements from atmospheric corrosion due to ozone, dust, or moisture.

The principle of an accurately controlled hot spark is said to be particularly advantageous for engines operating on cold carburetion. This would apply equally well to heavy-duty or passenger car engines arranged for cold induction systems or on standard engines in which it might be desirable to use "cold" spark plugs most efficiently.

New Truck Registrations by Makes by Months

	Autocar	Brookway	Chevrolet	Diamond T	Dodge	Federal	Ford	G. M. C.	International	Mack	Reo	Sterling	Stewart	Studebaker	White-Indiana	Miscellaneous	Total
January.....1936	75	94	15,124	495	6,207	223	14,606	428	4,743	90	339	8	85	143	493	607	43,760
January.....1935	71	86	9,867	550	5,141	152	13,260	858	3,513	114	380	10	42	127	308	280	34,759
February.....1936	57	88	14,978	510	5,556	170	12,226	758	4,365	107	217	4	62	134	408	661	40,301
February.....1935	41	54	11,701	499	3,271	113	14,330	570	3,174	63	292	10	34	107	217	321	34,797
March*.....1936	87	121	19,332	627	6,669	199	15,969	1,533	5,314	177	256	17	73	221	466	756	51,817
March*.....1935	55	66	13,607	528	4,216	130	16,603	827	3,620	97	377	14	60	135	252	407	40,994
April*.....1936	116	174	23,097	775	8,727	266	18,325	2,700	7,246	285	374	21	109	322	686	1,081	64,304
April*.....1935	79	109	14,832	557	5,605	172	17,709	846	4,451	154	433	31	60	184	298	546	46,066
Four Months†.....1936	335	477	72,531	2,407	27,159	858	61,126	5,419	21,668	659	1,186	50	329	820	2,053	3,105	200,182
Four Months†.....1935	246	315	50,007	2,134	18,233	567	61,902	3,101	14,758	428	1,482	65	196	553	1,075	1,554	156,616
% Change, Four Months.....	+36	+51	+45	+13	+49	+51	-1	+75	+47	+54	-20	-23	+68	+48	+91	+100	+28

*Does not include returns from Connecticut.

†Connecticut not included for March and April.

I looked at Oil Costs with one eye



**GULFLUBE
MOTOR OIL**



"I HAD it sized up this way: a bus uses lots of oil; might as well feed it cheap oil and save the difference.

"I was as wrong as the farmer who fed his horse shavings instead of hay. The horse died. My buses didn't, but they ran up maintenance costs that looked like a Chinese War Loan.

"I investigated these costs and maybe you think I didn't uncover some facts about oil that opened *both* my eyes.

"Retarded oil flow due to sludge was causing insufficient lubrication and too much wear on my motors. Free carbon was clogging oil lines and bearings and even causing serious abrasion. My oil was also 'giving up' too soon . . . getting thin as tea, and about as useful.

"A Gulf representative had me change to Gulflube. Here's the story that sold me:

"Gulflube is the only premium quality oil in the world that sells at a quarter a quart.

"An entirely different refining method—the Multi-sol Process—employs solvents which flush Gulflube clean of 'trouble-makers.' The carbon, sludge and wax-forming elements are practically weeded out.

"Gulflube has a high viscosity index—thins out less under heat . . . yet runs free in zero weather. Its film strength is high. And it's a pure mineral oil that won't corrode new alloy bearings.

"In mileage tests, Gulflube outclassed every regular priced oil on the market. This mileage, I understand, has been stepped up another 20 or 25%.

"Today, I wouldn't think of using any other oil in my buses."

If you are a fleet owner, Gulflube has an interesting money-saving story for you, too. The coupon below will bring you a truly eye-opening visit from a Gulf representative.

Gulf, 3800 Gulf Building
Pittsburgh, Pa.

CCJ-76

Gentlemen:

I should like to get the complete money-saving story on Gulflube.

Name _____

Address _____

City _____ State _____

News

SUMMARY of the Past Month

District Directors Named to Administer Carrier Act

Sixteen districts under the supervision of district directors as an aid in administration of the Motor Carrier Act have been established. The districts, the area they embrace, directors and their headquarters are as follows:

1. (Mass., Maine, Vermont, N. H., R. I.) George R. Nuzum, Boston.
2. (N. Y., Conn., N. J.) R. K. Hagarty, New York City.
3. (D. of C., Md., Del., Eastern Penna.) H. R. Stickel, Philadelphia.
4. (Ohio, W. Va., Western Penna.) R. M. Snetzer, Pittsburgh.
5. (Va., N. C., S. C.) Sam C. Blease, Charlotte, N. C.
6. (Ga., Fla., Ala., Miss.) F. P. Morgan, Atlanta, Ga.
7. (Ky., Tenn.) Herbert Qualls, Nashville, Tenn.
8. (Mich., Ind., Ill.) L. C. Loughry, Chicago.
9. (Minn., Wis., N. D., S. D.) W. E. Hustleby, Minneapolis.
10. (Iowa, Mo., Neb., Kan.) James F. Miller, Kansas City, Mo.
11. (Okla., Ark., La.) Ray G. Atherton, Little Rock, Ark.
12. (Texas) T. F. Childs, Fort Worth.
13. (Wyo., Colo., N. M.) D. P. Harris, Jr., Denver.
14. (Mont., Idaho, Utah) No director named, Salt Lake City.
15. (Wash., Ore.) F. E. Landsburg, Portland, Ore.
16. (Nev., Cal., Ariz.) R. T. Eddy, San Francisco.

Truxmore Has New Branch

The new factory branch of the Truck Equipment Co. in the New York area is at 4536 37th Street, Long Island City, New York. L. R. Ruoff is in charge.

Timken Ups Three

L. R. Buckendale has been elected vice-president in charge of engineering of the Timken Detroit Axle Co. Walter F. Rockwell has been elected secretary and A. I. Hawkins treasurer of the company.

The Lake Show is On!

The Great Lakes Exposition which opened in Cleveland June 27 will continue until Oct. 4. Truck and equipment manufacturers are well represented.

Pacific Freight Lines Expanding

The Pacific Freight Lines has received state authority from California to acquire the operative rights between Los Angeles and Orange County of the Richards Truck and Warehouse Co. Franchised operations of Keystone Express System and Los Angeles-Newport Freight Lines have also been acquired.

May Sales Up 29% Over Last Year; Output Up 33%

New truck registrations for May are estimated at 62,000 units, or an increase of 29 per cent over the 47,968 units sold in May, 1935. May also represents a 3 per cent gain in registrations over the estimated total of 64,304 units for April, 1936.

May production is estimated at 78,675 units or an increase of 33 per cent over the 59,324 units produced the same month last year. May falls below the production of 90,346 units for April by 13 per cent.

Production for first 5 months of 1936 totaled 382,978 or an increase of 17 per cent over the same period last year when 326,915 units were produced.

Truckers and R. R. Clash at Hearing

The first of a series of hearings before I. C. C. Examiner H. W. Archer on the railroad pick-up and delivery problem held in Washington, D. C., last month was marked by bitter clashes between counsel for both the roads and truckers. Efforts of truckers to require the railroads to show whether unanimity of opinion existed among them regarding the merits of the suspended tariffs were blocked.

Further hearings will be held in New York and, later, in Chicago, July 21, at the Sherman Hotel, to allow parties interested in "the border line" to be heard.

Security House Has Truck Interests

The Phoenix Securities Corp. has acquired a substantial interest in Consolidated Motor Lines, Inc., of Hartford, Conn., and is supplying the concern with cash to carry out a plan of expansion subject to rulings of the I. C. C.

Wallace Groves, president, and Walter S. Mack, Jr., vice-president of Phoenix Securities, have become directors of the truck company, as has Charles B. Colpitts.

N-L Sells Equipment to Evans

The Nichols-Lintern Co. of Cleveland has sold its heating and ventilating equipment to Evans Products Co., Detroit. The company has set up a department known as the Nichols-Lintern Division to handle this equipment.

Linderman Promotes Super

Ralph K. Super has been appointed chief engineer of Linderman Devices, Inc.

Insurance Men Put Truck Loss Above \$2,000,000 for 1935

The first official figures ever to be compiled showing the amount of insurance losses through all sources suffered by truck operators, have been prepared by the Inland Marine Underwriters Association. The figures were compiled at the request of Federal Coordinator of Transportation Eastman to be used as a guide in the I.C.C. insurance regulations.

The figures represent 94 per cent of the gross inland marine premiums written. They show total losses for 1935 of \$2,050,329.95. For 1934 they were \$2,087,217.43; and for 1933, \$1,697,362.90. Numbers of losses paid during the three years are given as: 12,375 in 1935, 12,969 in 1934, and 10,252 in 1933. Highest losses paid for the years given were: \$17,000 last year, \$20,000 for the year before, and \$28,865 in 1933. Lowest claims paid in the same years are: 31 cents in 1935, 10 cents in 1934 and 35 cents in 1933.

Laansma Is Chilton Editor

Al Laansma has been appointed editor of *Motor World Wholesale*, replacing Leon F. Banigan. Mr. Laansma had been managing editor of the publication since last November.

Dry Goods Group Against Paying for Truck Tariffs

The National Retail Dry Goods Association's joint mid-year conference in Chicago last month went on record against paying for motor carrier tariffs.

D. E. Brisbane, research counsel for the National Highway Users' Conference, warned the association that "Whether you as private carriers are subject to strict and uncompromising regulation lies entirely within the sound direction of the I. C. C. There will be insistent demands for such regulation by those carrier agencies now regulated. We may logically look forward to an avalanche of bills directed to place the intrastate operated under restrictions equal to or exceeding those provided by the Federal act."

Maryland Ups Gross Weights

During the special session of the Maryland General Assembly in March of this year, Section 194-2A of Article 56 of the Motor Vehicle Code was amended, increasing the gross road weights on all two-axle commercial motor vehicles, effective June 1, 1936.

Fletcher Joins Gar Wood

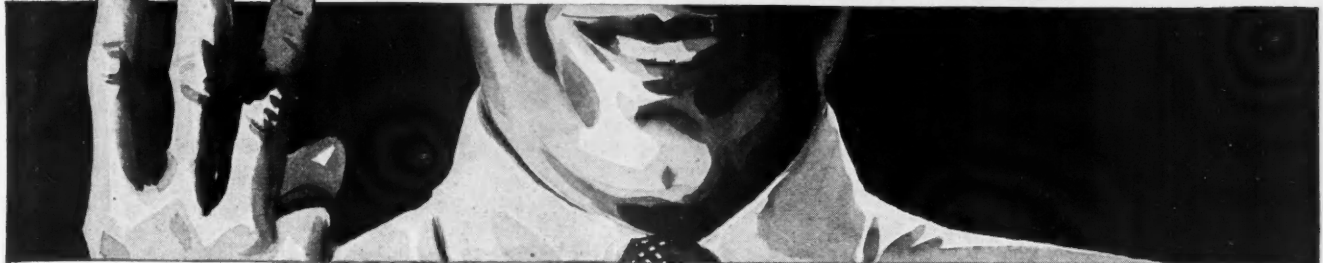
W. E. Fletcher is now sales manager of the tank division of Gar Wood Industries, Inc., Detroit. Gilbert V. Radoye has been placed in charge of publicity.


Correction On Cochin


The correct address of the Cochin Mfg. Co. is South San Francisco, Cal. The address of the company was incorrectly given as 116 New Montgomery Street, San Francisco, in the June issue of *COMMERCIAL CAR JOURNAL*.

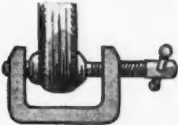


**MR. OPERATOR: THERE ARE THREE THINGS YOU
WILL WANT TO REMEMBER ABOUT
GENERAL TRUCK TIRES:**



STRONGER —all plies are *full* plies anchored at the bead—no floating “breaker strips”—every inch and every ounce is there for just one purpose—to produce more miles and a lower cost for you.

COOLER —they flex uniformly without that heat-producing “hinging action” of ordinary breaker-strip tires. Heat kills the life of cords and cuts down the miles in a tire. Generals are *cool*—that’s why they run more miles at a lower cost for you.

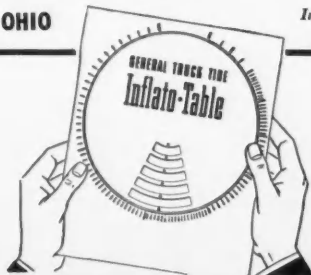
“COMPACT”  **RUBBER” TREADS**—all tires stretch due to fatigue in the fabric, but Generals, having no idle, half-way plies, stretch least of all. The tread is kept compact and compressed against the road—that’s why it produces more miles and reduces your cost.

THE GENERAL TIRE & RUBBER CO. • AKRON, OHIO

In Canada—The General Tire and Rubber Company of Canada,
Limited, Toronto, Ontario

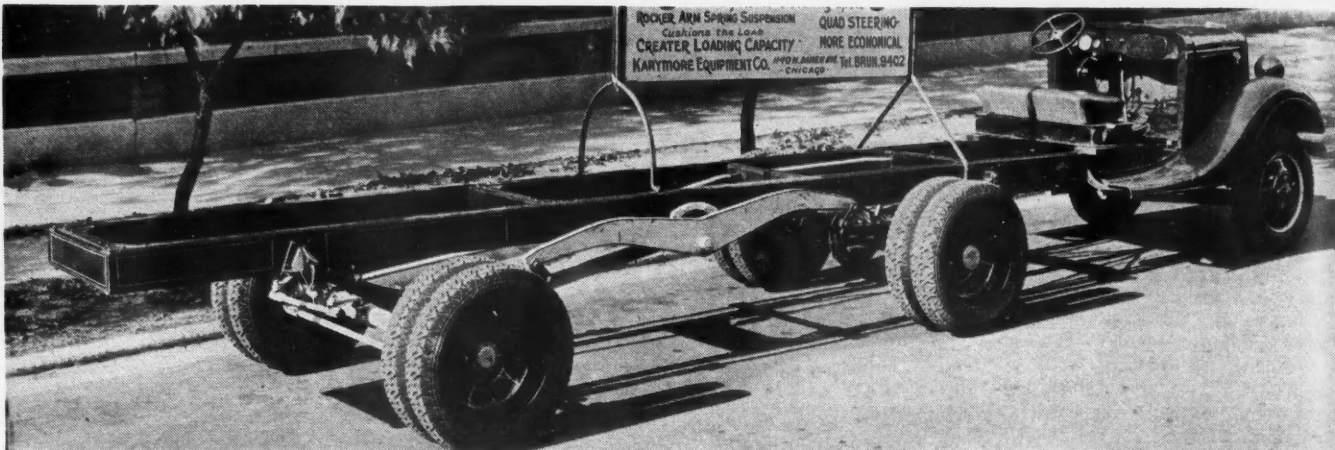
FREE! INFLATO-TABLE!

This inflato-table will tell you how much air to put in your tires. It will show you when your tires are overloaded. It will tell you how much load a certain size tire can carry with safety. *It's Free.* Go to your General Tire dealer and ask for yours.

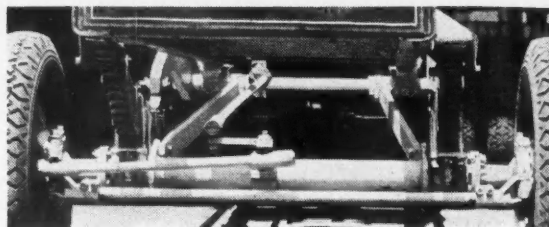


GENERAL BUILDS a complete, highly specialized line of truck tires. GENERAL TIRE DEALERS are practical truck tire men with wide experience and accurate knowledge in fitting the right type and size of tire to every kind of job. **THIS COMBINATION** is worth real money to you. If your job is tough, call in the General Tire dealer and let him prove these statements.

GENERAL TRUCK TIRES



The new Kary-More unit which is being produced by the Kary-More Equipment Co., 1140 N. Damen Ave., Chicago, Ill., attaches to any standard truck. After it is attached the truck becomes a six-wheeler with a two axle steering gear. The two springs of the two rear axles are attached to a rocker arm which pivots upon a center acting as a load stabilizer. The front and rear wheels have synchronized steering with the customer having the option of purchasing either a hydraulic or air booster for the rear axle steering mechanism. Likewise the customer may obtain his preference of either hydraulic or air brakes. The unit when set upon a 131 in. wheelbase truck will give a loading space of 22 ft. and a proportionate space with increase of wheelbase



Spot Painting Methods

(CONTINUED FROM PAGE 20)

other shopmen cannot cut similar blocks for themselves.

The damaged panel spot thus repaired is sanded, primed and knifed. The putty is then water-sanded with course number 220 sanding paper and finished with 320. The spot is then touched up with one primer coat, rubbed down slightly with the fine grit 320 paper and a coat of color, then clear synthetic is applied over the entire panel.

THE John Wanamaker fleet of Philadelphia also follows the practice of the United Parcel shop of finishing the entire body panels with a coat of clear finish. C. W. Goll, superintendent of equipment, puts fleet appearance on a par with operating efficiency and the Wanamaker fleet is as spotless as a white swan.

In the Wanamaker shop, spots are prepared in the usual manner and primed, but two or three coats of filler and putty are applied, with sanding between coats. Sanding is followed by two coats of color and 12 hours of drying time is allowed. All spot work is done with the brush and the final finish is as free from orange peel as any job witnessed. Once the color spotting is finished, much in the manner of general good shop practice, a coat of clear synthetic is applied over the entire

panel. The clear coat is thinned 10 to 15 per cent, depending on the dampness of the weather, and is brushed on very rapidly. Application is first vertically, then the clear is brushed out horizontally, eliminating runs and brush marks.

Cracked spots are first treated with solder filler applied with a solder spray gun, sanded and primed and finished. An interesting bit of advice from Mr. Goll is that the use of a gray surfacer under black gives a richer, more satisfactory finish. A yellow surfacer is used under the yellow finish coat which so prominently identifies the swell looking John Wanamaker fleet.

WILLIAM ADOLPH, in charge of the fleet of Modern Laundry in Philadelphia, is proud of the appearance of his trucks. He has reason for being so proud. His trucks, finished in red, always look spotless and the synthetic enamel finish seems to glow particularly brilliantly. Mr. Adolph rubs down spots wet with emery cloth because he believes it gives a smoother and more lasting job. He uses gasoline for wetting liquid and obtains a fine featheredge. Primer is then brushed or sprayed on, depending on the size of the spot, although he insists that the spray job lasts longer. The primer is allowed to dry at least 12 hours and is then rubbed very lightly with emery dry. A neutral shade surfacer is then applied, sanded with emery, and then the color is blended and two coats are sprayed on.

If the spot is on the edge of the panel, the spray is worked from the extreme edge inward to the original color. By misting the gun, in the manner already described, the color will blend in with the old finish.

Practices in spotting fenders and hoods are pretty much the same among those shops visited, and this general practice may be stated for all. In the Modern Laundry fleet, the fenders and hoods are black. In this instance no surfacer is used. Spots are simply cleaned down, primed and finished with the minimum of effort. Fenders, particularly, in the Wanamaker fleet are cleaned down to the metal and re-finished simply with primer, surfacer and a coat of black. This is done about as quickly as it takes to do a spotting job and proves much more satisfactory.

If the hood is in color, it has to be finished much in the manner of the body. The area may be spot cleaned and featheredged but it is sometimes advisable to spray the top panel of the hood to the molding.

Fenders are sanded clean, primed, surfaced and finished. A general shop practice with fenders that have touch-up black, or baked enamel that has been chipped and shows rust pocks, is to sand and seal with a thin coat of primer-sealer instead of the regular priming coat. The surfacer is then applied, sanded and finally finished with a finishing coat. Waxing the original fender finish will bring up its lustre and serve to hide the spot.



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COMMERCIAL CAR JOURNAL
JULY, 1936

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Complete Truck Specifications Table Will Be Published in August

Line Number	MAKE AND MODEL	GENERAL (See Keynote)				TIRE SIZES		ENGINE DETAILS							TRANSMISSION		REAR AXLE			FRONT AXLE	BRAKES					FRAME																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
		Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B.	Gross Vehicle Weight with Max. Tires	Chassis Wt. (Stripped)	Standard Front and Rear	Maximum Tire Size	Furnished	Make and Model	No. of Cylinders, Bore and Stroke	Displacement	Comp. Ratio	Torque lb. ft.	Max. Brake H.P. at R.P.M. Given	Number, Diameter and Length	Governor Standard	Make and Model	Forward Sp'ds	Make and Model	Gear and Type	Drive & Torque	Gear Ratio	Range in High	Make and Model	Make Location	Operating Type	Lining Area	Drum Area	Drum Material	Hand Location	Type	C-A Dimension (Std. W. B.)	Side Rail Dimensions	Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Vacuum Power Brakes

(CONTINUED FROM PAGE 15)

1. With a vacuum gage check the amount of vacuum produced by the engine at the manifold. Note reading with idling engine and replace fitting.

2. Disconnect the hose at the manifold side of the operative valve. Connect the vacuum gage to the hose and take the reading with the engine idling. If the amount of vacuum is within an inch of the reading at the manifold there is no leak in the line.

3. Reconnect the line to the valve. Disconnect the hose on the cylinder side of the operating valve and connect vacuum gage to the valve fitting. If the valve does not leak, the reading should be zero with the engine idling.

4. With the vacuum gage still connected to the operating valve depress the brake pedal. If the valve is operating correctly the reading should be within 1 in. of reading at manifold.

5. Reconnect the hose to the valve and disconnect the hose at the power cylinder. Connect the vacuum gage to the hose. The reading should be zero. Depress the brake pedal. The reading should be within an inch of the reading at the manifold.

6. Connect a Tee into the hose line and power cylinder and connect the vacuum gage to the other end of the Tee. With the engine idling the reading should be zero. Depress the brake pedal and the reading should be within an inch of the reading at the manifold. If the vacuum shows a drop, air is leaking past the piston. A drop of 2 in. of vacuum anywhere along the line will not seriously affect the braking operation but when the drop is 4 in. or more it should be remedied.

To correct air leaking past the piston, disconnect the hose and clevis so that the piston can be revolved and worked back and forth. Insert lubricant and work piston back and forth and revolve it. Then push piston all the way to the rear and plug the hose opening securely with the finger. If the piston can be pulled to the front without air escaping by the finger, air is still leaking past the piston and the cylinder will have to be disassembled and the piston packing replaced. If it cannot be pulled forward without air leaking by the finger, connect again and test with a vacuum gage. If there is a leak in the diaphragm type power unit, the diaphragm must be replaced.

On the vacuum suspended cylinder or double line unit the method of locating leaks is as follows:

1. With vacuum gage check the amount of vacuum produced by the engine at the manifold. Note the reading with idling engine; replace fitting.

2. Disconnect the hose at manifold

side of operative valve. Connect the vacuum gage to the hose and take the reading with the engine idling. If the amount of vacuum is within an inch of the reading at the manifold there is no leak in the line.

3. Reconnect line to the valve. Disconnect the hose on the cylinder side of the valve. Take reading with the engine idling. If the valve does not leak the reading will be within an inch of the reading at the manifold. Reconnect hose to valve.

4. Disconnect lines from both ends of the power cylinder. Connect vacuum gage to hose leading from manifold and plug the hose leading from the valve with a cork. If there are no leaks in the lines the reading will be within an inch of the reading at the engine with the engine idling.

5. Reconnect the manifold to cylinder hose with a Tee and connect the vacuum gage to the other end of the Tee. With the hose line from the operating valve still plugged and the engine idling note the reading. If the cylinder is okay the reading will be within an inch of the reading at the manifold. If the reading is low the leak is past the piston packing.

6. Connect the manifold hose to the power cylinder and connect a Tee into the valve-cylinder line and connect in the vacuum gage. With the engine idling depress the brake pedal. The vacuum should show a sharp drop when the pedal is depressed and a sharp recovery when it is permitted to return. If the vacuum gage shows a slow recovery a reserve tank is needed.

If a check valve is used in the system it is necessary to check the length of hose running to it for leaks with the vacuum gage and the valve itself can be checked by connecting the gage to the side away from the manifold and after shutting off the engine check to see if the valve holds the vacuum for a reasonable length of time. Another check is to apply the brake after the engine has been shut off. If the application requires abnormal effort the check valve isn't working.

Usually there is an air cleaner provided on the operating valve. This cleaner should be removed and cleaned every six months and if the valve is mounted in an exposed position it is sometimes necessary to cover the entire valve with a cloth bag to protect it from road dirt.

Under no consideration should the linkage or levers be changed to correct failure of a vacuum power brake if the brakes have been operating satisfactorily. If the power unit has been bumped it is possible that there is some misalignment that causes binding, but levers and linkage should never be changed unless there is reason for it.

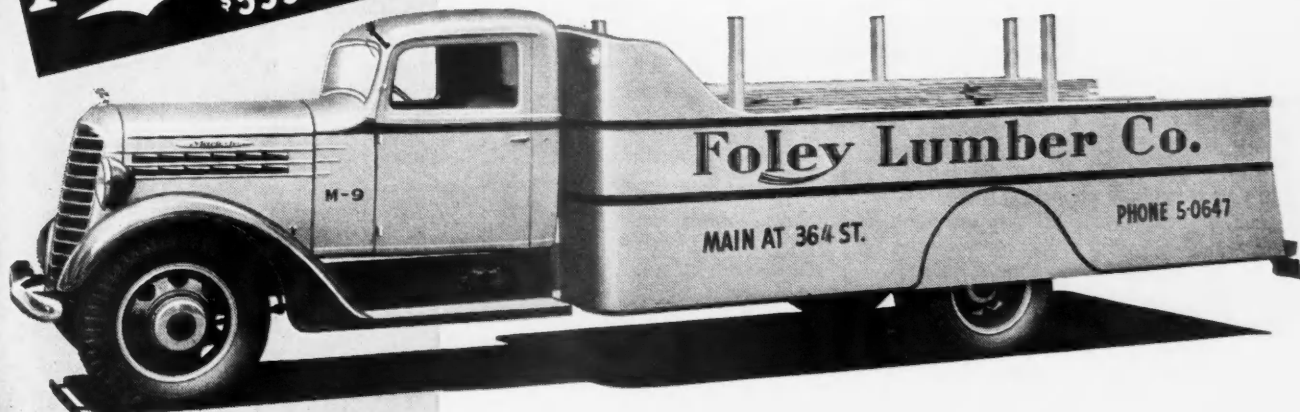
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MACK TRUCKS, INC., NEW YORK, N. Y.

A Shipper Gives Rates the Third Degree

(CONTINUED FROM PAGE 29)

cent, the maximum differential 21 cents. On the other hand, from fourth class to sixth class Keeshin's rates are higher than the rail rates. These differentials in favor of the railroads ranged from a minimum of 2 cents to a maximum of 94 cents. A casual glance at the statement of comparative rates reveals that the differentials in favor of the railroads from fourth to sixth classes are much greater than the differentials in favor of Keeshin from first to third class.

THESE preliminary observations make it clear that Keeshin is not entertaining any grandiose ideas about capturing all or most of the business now going over the rails. One does not have to be a traffic expert to realize that trucking rates higher than rail from fourth class to sixth class dismiss the bulk of carload business now being handled by the railroads. Besides, Keeshin's classification has no T. L. ratings; all ratings are "any quantity" ones. Further evidence of this is provided by the Keeshin practice of "freezing" the rate structure from third class, fourth class or fifth class on down the line. Usually this occurs when the first class is more than \$1.10, thereby indicating that Keeshin considers long haul business profitable and desirable only when it is not rated lower than third class, or fourth class. Furthermore, a "stop-loss" provision is inserted in the tariff whereby merchandise with a high rating but occupying much space and having little weight is discouraged. This clause simply says that all freight is subject to a minimum charge of 15 cents per cubic foot. Looks like many shippers will have to dig up grade school arithmetic books to recall how cubical contents are calculated. (Note—A smart trucker could prepare a simplified table showing how it's done, and distribute it as a useful piece of advertising.)

In order that no desirable traffic may be overlooked Keeshin has published "All Commodity" rates, subject to some exceptions, between principal cities. In every instance checked these all-commodity rates are less than Keeshin's sixth class rate, but they are higher than rail fifth class rates, the usual carload basis.

EVERY Keeshin class rate is subject to percentage reductions when a single shipment weighs more than 5000 lb. The rate for 16,000 lb. or more of freight in a single shipment is reduced

Keeshin Motor Express Classifications versus Railroad Classifications

BETWEEN	CLASSIFICATIONS						Keeshin's "All Com- modity" Rate	Keeshin's 6th Class, Less 15% 20,000 lb. Min. Wt.	Higher Than Rail Class
	1	2	3	4	5	6			
New York—Chicago									
Keeshin.....	140	125	100	98	95	90	85	77	5
Railroad.....	152	129	106	84	76	42			
Difference via Keeshin.....	-12	-4	-6	+14	+16	+48			
New York—Buffalo									
Keeshin.....	78	68	58	57	52	49		42	5
Railroad.....	99	84	69	50	35	27			
Difference via Keeshin.....	-21	-16	-11	+7	+17	+22			
New York—Kansas City									
Keeshin.....	212	180	148	148	148	148	135	126	4
Railroad.....	225	191	158	124	84	62			
Difference via Keeshin.....	-13	-11	-10	+24	+64	+86			
New York—Detroit									
Keeshin.....	117	99	82	70	70	70	65	60	5
Railroad.....	123	105	86	62	43	34			
Difference via Keeshin.....	-6	-6	-4	+8	+27	+36			
New York—Pittsburgh									
Keeshin.....	99	84	69	59	54	50	40	43	5
Railroad.....	104	88	73	52	36	29			
Difference via Keeshin.....	-5	-4	-4	+7	+18	+21			
Philadelphia—Boston									
Keeshin.....	88	75	62	53	48	44		37	5
Railroad.....	92	78	64	46	32	25			
Difference via Keeshin.....	-4	-3	-2	+6	+15	+19			
Pittsburgh—Binghamton									
Keeshin.....	87	74	61	52	48	44	38	37	5
Railroad.....	92	78	64	46	32	25			
Difference via Keeshin.....	-5	-4	-3	+6	+16	+19			
Philadelphia—St. Louis									
Keeshin.....	154	131	108	108	108	108	95	92	4
Railroad.....	160	136	112	88	80	44			
Difference via Keeshin.....	-6	-5	-4	+20	+28	+64			
Cleveland—Cincinnati									
Keeshin.....	75	64	53	45	41	38		32	5
Railroad.....	77	67	55	40	28	22			
Difference via Keeshin.....	-4	-3	-2	+5	+13	+16			
Cleveland—Chicago									
Keeshin.....	85	72	60	51	47	43	35	37	5
Railroad.....	92	78	64	46	32	25			
Difference via Keeshin.....	-13	-6	-4	+5	+15	+18			
Cleveland—Hartford									
Keeshin.....	114	97	80	68	63	63		54	5
Railroad.....	116	99	81	58	41	32			
Difference via Keeshin.....	-2	-2	-1	+10	+22	+31			
Chicago—Janesville, Wis.									
Keeshin.....	51	43	36	31	28	26		22	5
Railroad.....	55	47	39	28	19	15			
Difference via Keeshin.....	-4	-4	-3	+3	+9	+11			
Chicago—Lynn, Mass.									
Keeshin.....	152	129	106	106	106	106		90	4
Railroad.....	154	131	108	77	54	42			
Difference via Keeshin.....	-2	-2	-2	+29	+52	+64			
Nashville—Chicago									
Keeshin.....	133	113	93	80	80	80		68	5
Railroad.....	138	117	97	76	62	38			
Difference via Keeshin.....	-5	-4	-4	+4	+18	+42			
Schenectady—Toledo									
Keeshin.....	109	93	76	65	60	60		51	5
Railroad.....	114	97	80	57	40	31			
Difference via Keeshin.....	-5	-4	-4	+8	+20	+29			
Pittsburgh—Fort Wayne									
Keeshin.....	86	73	60	52	47	43	34	37	5
Railroad.....	89	76	62	45	31	24			
Difference via Keeshin.....	-3	-3	-2	+7	+16	+19			
Pittsburgh—Kansas City									
Keeshin.....	172	146	120	103	103	103	97	88	5
Railroad.....	179	152	125	90	63	49			
Difference via Keeshin.....	-7	-6	-5	+13	+40	+54			
Baltimore—Chicago									
Keeshin.....	135	115	95	95	95	95		81	4
Railroad.....	140	119	98	70	49	39			
Difference via Keeshin.....	-5	-4	-3	+25	+46	+56			
Baltimore—Indianapolis									
Keeshin.....	123	105	86	74	74	74		63	5
Railroad.....	128	109	90	64	45	35			
Difference via Keeshin.....	-5	-4	-4	+10	+29	+39			
Detroit—Chicago									
Keeshin.....	76	65	53	46	42	38	30	32	5
Railroad.....	84	71	59	42	29	23			
Difference via Keeshin.....	-8	-6	-6	+4	+12	+15			
Detroit—Kansas City									
Keeshin.....	155	132	109	93	93	93	76	79	5
Railroad.....	162	138	113	89	61	45			
Difference via Keeshin.....	-7	-6	-4	+4	+32	+48			
Buffalo—Chicago									
Keeshin.....	105	89	74	63	58	53	48	45	5
Railroad.....	110	94	77	55	39	30			
Difference via Keeshin.....	-5	-5	-3	+8	+19	+23			
Philadelphia—New York City									
Keeshin.....	53	45	37	32	29	27	30	23	5
Railroad.....	56	48	39	28	20	15			
Difference via Keeshin.....	-3	-3	-2	+4	+9	+12			
Chicago—Kansas City									
Keeshin.....	109	100	85	74	68	62	East'd 50 West'd 54	53	5
Railroad.....	130	111	91	72	49	36			
Difference via Keeshin.....	-21	-11	-6	+4	+19	+26			

**"SMOKE
UP...
your tip got me
a bonus"**

Here's a story of how a "shop talk" session over midnight coffee profited one fleet. A bus driver had explained how his company cut operating expense. A live-wire driver who heard him got the details and turned them in to his "Super". The net result was a lowered cost-per-mile for his own fleet and a bonus for him.

THE bus company officials learned from Standard Oil (Indiana) combustion engineers that minor combustion faults and unnoticed little power leaks were responsible for a much higher than necessary cost-per-mile (said the bus driver).

They had measured and checked in each bus the 16 vital factors that control gasoline economy and motor smoothness, exposed the faults and seen them corrected, had set each engine for its peak operating efficiency—and the fleet's gas and oil cost-per-mile dropped over 10%!

The truck driver carried this story of Standard Oil service back to his terminal garage and turned it in as a recommendation. His superintendent, by reasoning that (1) the analysis was free, (2) if it worked for a bus it should work for a truck fleet, thought it worth a trial and called in our engineers.

Once again the results proved the value of Standard Oil service. *The fleet saved enough on gasoline to buy all its oil!* . . . one of hundreds that have so profited.

Perhaps the cost-per-mile in your fleet is too high. Ask your nearest Standard Oil (Indiana) office to loan you one of their combustion engineers for a free analysis—and you'll get results . . . that's certainly worth a phone call!

STANDARD OIL COMPANY (INDIANA)
910 SOUTH MICHIGAN AVENUE • CHICAGO, ILL.



STANDARD OIL PRODUCTS: ISO-VIS "D" • Standard Transmission Oil (Summer and Winter Grades) • Standard Heavy Duty Gear Grease • Standard Wheel Bearing Grease (Medium and Heavy) • Standard Fibre Grease (for Universals) • Standard Pressure Gun (Medium and Heavy) • Standard Water Pump Grease • Standard Steering Gear Lubricant.

Copyright 1936, Standard Oil Co.

STANDARD OIL SERVICE

(CONTINUED FROM PAGE 46)
15 per cent. But even when such a shipment is rated sixth class the reduced rate, with but one exception, was found to be *higher* than the rail fifth class. On the one exception Keeshin's reduced sixth class rate was the same as the rail fifth class. Moreover, in seven instances Keeshin's sixth class, reduced, was even higher than the fourth class via rail.

When one considers that so much rail carload traffic is rated fifth class or lower it is obvious that Keeshin has deliberately decided his trucks cannot profitably compete for this business by

publishing rates either differentially lower than or on a parity with the rail rates. As a matter of fact, Keeshin does not even make a serious bid for less-than-carload business rated lower than third class, of which there is a substantial quantity. Greater emphasis is given this when we remember that Keeshin's "All Commodity" rates (20,000 lb. minimum) and sixth class reduced rates are usually this carrier's lowest rates. Keeshin has published very few commodity rates, and has an iron and steel tariff applicable only between points west of the Indiana-Illinois line.

It is understandable that one not well informed about truck traffic matters would accept these few remarks without qualifications. However, there are a few additional observations of great importance yet to be made. It will be recalled that in a previous article mention was made that Keeshin has his own classification, and that it is quite different. To the extent that the ratings in this classification are different some of the conclusions already made as to Keeshin's rates must be modified.

In order to determine the difference between Keeshin's classification and the railroad classification, and in order to estimate the effect of such classification differences upon the Keeshin-rail rate relationship, 36 varied and representative articles were listed.

In comparing Keeshin's classification of these articles with the railroad's classification it was found that 11 articles take the same ratings in both. Since all but one of these articles are rated third class or higher, Keeshin was under no necessity to give them a lower classification than railroad because the Keeshin first, second, and third class rates are less than rail.

In only one instance of the 36 checked did Keeshin have a higher classification rating than the railroads. This was on Advertising Window Displays, a bulky and light article, obviously not profitable truck traffic.

KEESHIN classifies 24 of these articles lower than the railroads. The following table indicates the result of these lower classifications, the conclusions being based on the Keeshin-rail rate comparisons previously mentioned.

No. of Articles.	Rail Class.	Keeshin Class.
5	3	6
1	2	5
2	3	5

In every test made of the above classification reductions by Keeshin it was found they had the effect of making Keeshin's rate lower than the rail L. C. L. Usually these reductions are on articles on which the railroads often grant "L. C. L. Commodity rates or Exceptions." Hence the necessity for the lower classification by Keeshin.

No. of Articles.	Rail Class.	Keeshin Class.
5	2	3

Keeshin's rates on these articles are lower than rail without classification reductions. Therefore, classification reduction by Keeshin evidently made to meet C. L. ratings or rail exceptions and commodity rates.

(TURN TO PAGE 50, PLEASE)

FAST ACCELERATION



HEAVIER LOADS SMALLER GEARS

are just **THREE**
of the reasons why

"STURACO"

**EXTREME PRESSURE ("E.P.")
GEAR AND CHASSIS
LUBRICANTS**

are required for operating conditions of today,
AND WHY after **FOUR** years of actual road service these top quality lubricants are becoming adopted by a steadily growing number of large motor fleets of outstanding reputation for economical maintenance.

**Change to "STURACO"
for 90 days and see the
difference.**

**IT'S YOUR LOWEST COST
INSURANCE POLICY!**

**"STURACO" E. P. LUBRICANTS
ARE THE ORIGINAL DEVELOPMENT OF
D.A. STUART & CO.
ESTABLISHED 1865
GENERAL OFFICES: 2727-2753 SO. TROY ST. CHICAGO, U.S.A.
BRANCHES IN PRINCIPAL CITIES**



WHAT A BEATING BEADS* TAKE ON HIGHWAY FREIGHTERS!



—But Beads in Improved High Profile Goodyears Can Take It

Improved High Profile Goodyear Truck Tires are made with heavy, braided-wire beads, securely tied in by the plies of the tire. And your truck tires need strong, dependable beads just as an athlete needs strong ankles.

You'll get better performance from these improved Goodyears. Ask your Goodyear dealer to show them to you.

They are bigger, sturdier, tougher—more rubber, more cotton, more air space. They have longer side walls. That means less generation of heat, more diffusion of heat that is generated. In every way they give you more for your money—yet they cost no more.

Other reasons why they're **MONEY SAVERS** are these: Supertwist Cord construction—All-Weather tread—heat-resisting rubber—and Pima Cotton, the longest cotton fibre grown.

THE GOODYEAR TIRE & RUBBER COMPANY, INC.
AKRON, OHIO

*EXTRA STRONG BEAD CONSTRUCTION

To provide strength for heavy loads, swaying loads, high loads, Goodyear truck tires have an extra-strong, heavy, braided-wire bead—wide and securely tied in by the plies of the tire. This construction insures a firm seating of tire on rim. The larger size truck tires have dual beads.

GOOD YEAR

TRUCK TIRES

money
savers

(CONTINUED FROM PAGE 48)

No. of Articles.	Rail Class.	Keeshin Class.
2	3	4
4	1	2

Keeshin rates on these are lower without classification reductions. Reasons for reductions undetermined, unless it be based purely on the natural advantages of trucks to handle these specific articles.

No. of Articles.	Rail Class.	Keeshin Class.
2	4	5
1		5

These classification reductions result in very few Keeshin L.T.L. rates lower than rail L. C. L. It does result in putting some of the Keeshin rates on a par with those of the railroads. The balance of the Keeshin rates remain higher than rail in spite of the lower classification.

No. of Articles.	Rail Class.	Keeshin Class.
2	4	6

Results in Keeshin rates becoming lower than railroad in about half of the instances tested. The balance were either higher or the same as rail.

Note: These conclusions effect L.T.L. only.

There is little or no reason to change any conclusions regarding Keeshin's competitive rate position toward the rail carload business in so far as the rates themselves are concerned. Time in transit, handling, and packing regulations are, of course, other factors which help determine the choice of shipping media.

THE importance of these Keeshin rates to other truckers is plain. To the extent to which the National Motor Truck Classification parallels the rail Classification, and to the extent that motor carriers subject to the National Classification have rates the same as those of the railroads, Keeshin has much the same competitive position with relation to these truckers as it has to the rails.

Mention should be made of the fact that in comparing Keeshin and rail rates no consideration was given to the Emergency Increases granted the railroads. This charge will expire July 1, unless the I.C.C. grants the rail carriers' plea for an extension. Anyway, even if the Emergency Charge was included in the calculations it would not involve any substantial revision of these comments. Incidentally, if the Emergency Charge is not extended, Keeshin, and other truckers, will find it necessary to revise their rates downward in order to maintain the existing rate relationship with the railroads. *It is clear that in many cases the rail emergency charge is the only thing that permits the truckers to have rates differentially lower than railroad rates.*

Although considerable space has been devoted to discussing Keeshin rates there is no intention to imply that Keeshin rates are more important than any other carrier's. It just happens that Keeshin's unusual rate set-up requires more words to explain and interpret, as it also deserves special comment because it departs from the conventional pattern. My concluding observation is that Keeshin has definite ideas as to the kind of traffic he can handle at a profit, and that he has no intention of seeking any other kind. There is no doubt that much independent thought has been given to the preparation of the Keeshin rate structure. It will be most interesting to watch the results.

IN GOING from Keeshin's tariffs to those issued by D. T. Waring, for the Middle Atlantic States Motor Carriers Conference, one quickly recognizes that publishing rates for a large group of truckers is a far more complex task. However, in spite of the fact (TURN TO PAGE 53, PLEASE)

*two speeds...
two reductions...*

AND

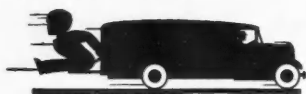
**TOO GOOD
TO MISS..**



...TIMKEN 2-Speed Axle

now available in two capacities

A FAST RATIO



for speed...

A SLOW RATIO



for grades...



▼ big husky gears in both ratios, with all the ruggedness of Wisconsin Double Reduction heretofore limited to high priced trucks

▼ only three added working parts

▼ a perfectly accessible, easily removable carrier unit

You'll cut costs by increasing average vehicle speed and fuel savings with this better axle, typically Timken in its thorough engineering and quality workmanship.

The World's Largest Axle Builder

**THE TIMKEN-DETROIT AXLE COMPANY, Detroit, Mich.
WISCONSIN AXLE DIVISION, Oshkosh, Wis.**

(CONTINUED FROM PAGE 50)

that many of the participating carriers have filed numerous exceptions to the rates, regulations and routings contained in the tariffs, the publications are creditable even if occasionally revealing the haste in which they were compiled. If the carriers in the conference had more unanimity as to rates and regulations it would be easier on the often perplexed shipper. No doubt that will come later.

In comparing the Conference's class rates with the rail rates, seldom does one find any variations. I have looked over 600 such rate comparisons and venture the guess that not more than 5 or 10 per cent vary from the rail rates. As a consequence, only the assessment of the railroad Emergency Charge makes these truck rates differentially lower than rail rates. It is appreciated, however, that at present some of the competing railroads do not yet render a free store door delivery as trucks do.

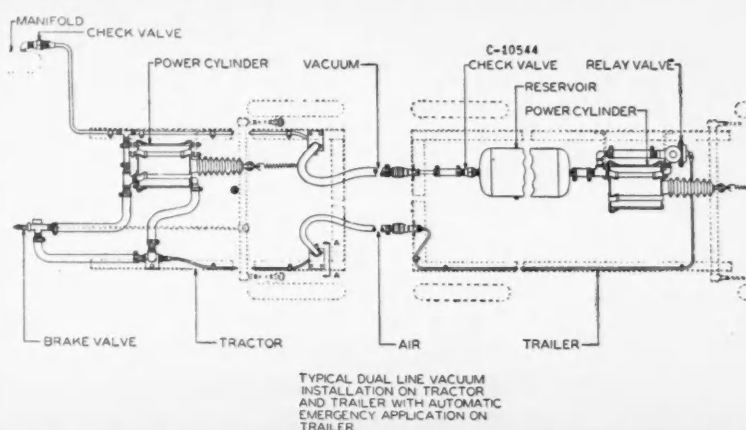
A rather surprising feature of this Conference's rates is the great number of special commodity rates. It takes little imagination to appreciate that this came about through the insistence of individual truckers in order to protect large and steady movements of traffic they have come to depend upon. Quite often the application of these commodity rates is restricted to a specific carrier for each move. It seems strange that competing truckers did not also agree to the same commodity rates in order to have a chance at the traffic. Still, some of the rates are so low that one does not blame a trucker for steering clear of them. Moreover, many of the commodity rates bear no discernible relationship to class rates, or even to each other. Clearly, they were established to secure or retain the business, come what may.

Some of the commodity rates are unnecessarily low: 15½ via rail, 8½ via truck, same minimum weight—is an example. Some are on commodities better left to the railroads. In other cases one of the truck's special advantages is used to good purpose. That is, the granting of low commodity rates with low minimum weights. For instance, via rail 14 cents with a minimum of 26,000 lb., via truck 20 cents with a 17,000 lb. minimum. It is surprising the amount of traffic these kind of rates will attract to the trucks. It is also surprising to find trucks publishing rather low commodity rates on L. T. L., whereas the railroads are getting away from the practice. It will be even more surprising if truckers are able to operate profitably under some of the low rates they have established. I imagine ill will sometimes will be incurred when truckers must increase

such low rates. Obviously, there is not space enough to go into all of these rates and their varying implications.

IT IS puzzling to find that only three truckers subscribe to the clause in Waring's tariff stating that proportional rates shall be 75 per cent of the published rates. (Keeshin makes it 80 per cent of the published rates.) A sensible rule is the one stating that rates apply only via a single line when the trucker operates between origin and destination. Equally sound is the rule which says a through rate is not

applicable if it requires handling by more than three carriers. The United States Trucking Corp. will not haul between any two points both of which are within 40 miles of New York's City Hall. It would have been much easier had the shipper been spared the necessity of checking out the road mileages. A handy item in Waring's tariff is the one wherein truckers specify those carriers with whom they interchange freight, and the points of interchange. A few items in Waring's tariffs are so involved that they are liable to discourage rather than encourage the



MIDLAND *Power Brakes*

(Christensen)

FLEET operators can count on Midland power brakes—because, for one reason, they are being used by so many leading manufacturers as standard equipment.

Made by one of the world's largest parts manufacturers from exclusive Midland-Christensen patents. Interchangeable in fleet operation. Conform to all state laws. Complete line—both air and vacuum—including kits for Ford, Chevrolet, Dodge, GMC and International. Serviced by nation-wide organization of Midland distributors. "Put your power brake problems up to Midland!"

Midland power brakes never cost more and generally less than other power brake equipment.

MIDLAND STEEL PRODUCTS CO.
10605 MADISON AVE. • CLEVELAND, O.

Satisfy the Largest Fleet Owners

MIDLAND STEEL PRODUCTS CO.
10605 Madison Ave. : Cleveland, O.

Send complete facts and price on Midland power brakes for.....trucks, with name of nearby distributor.

Name.....

Address.....

City.....State.....

shipper. The easier it is for the shipper to read your tariff the easier it is for him to use your service. It should be remembered that while you have only a few tariffs, shippers have to use thousands.

When one looks over the class rates published by the Cleveland, Columbus and Cincinnati Highways, Inc., one for a moment wonders whether it is really a trucking tariff. The makeup of the tariff is, of course, just like a railroad issue. But the parallel is more pronounced when the rates are compared. Out of 223 rate comparisons made the rates were different in only 21 in-

stances. In each of the 21 instances the trucking rates were *higher*. Since this carrier is governed by the National Truck Classification there is no escaping the conclusion that it is relying upon superior service rather than low rates to attract business from the rails and other truckers.

ACCURACY requires, however, mention be made that this carrier has exceptions to the Classification and a tariff of commodity rates. Moreover, on L.T.L. rated fourth class or higher, and weighing from 5000 lb. to 10,000 lb. a 5 per cent reduction in the rate

is allowed, but not to exceed 3 cents. A 10 per cent reduction is granted on more than 10,000 lb., but not to exceed 5 cents. The class tariff also carries a rule whereby the T.L. Minimum weights as provided in the National Classification are drastically reduced, according to the rating provided for them. In order to insure against uneconomic traffic this line has a minimum *charge* per T.L. shipment which is at the Column A rate for 20,000 lb. Caution, if not originality, seems to dominate this rate set-up.

The tariffs issued by H. M. Slater, Agent for the Central Motor Freight Association, seem to be based on more careful and intelligent study than other trucking tariffs examined. Although I have not studied this agent's class tariffs I have given some attention to his commodity issues. These latter publications seem to reflect more truly than usual those commodities which can most advantageously move via truck, and those commodities which are most characteristic of the region served by the carriers in the rate Conference. Moreover, the commodity rates appear to have a sounder basis and a closer relationship to truck costs, while at the same time conferring benefits upon the shipper. The following is a good example of flexible yet thoughtful rate making.

Freight—All Kinds

Chicago to Minneapolis—St. Paul		
10,000 lb.	15,000 lb.	20,000 lb.
*60	*55	*50
**65	**60	**55

*Subject to a minimum of 20 lb. per cu. ft.

**Subject to a minimum of 15 lb. per cu. ft.

As a basis for comparison it might be mentioned that the rates via rail are 69 cents for fourth class, 57 cents for Class A, and 47 cents for fifth class. Incidentally, most commodity rates in Slater's tariffs vary according to the three minima shown above. If it is not a unique device, at least it is unusual. No doubt it will be adopted more widely by truckers.

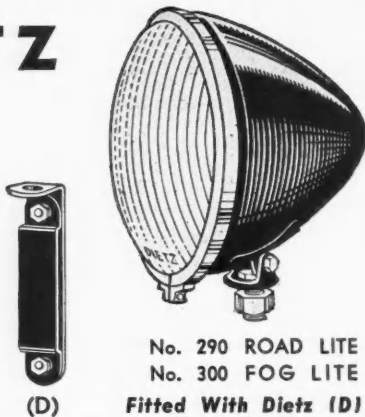
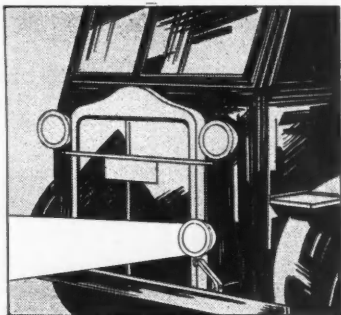
The simplicity of Slater's tariffs is indicated by the following table from a class tariff. Many other tariff compilers would become muddled in trying to convey the same idea.

Exceptions to Quantity Ratings

Minn. Weight.	Class. L.T.L.	% First Class Rate to Apply.
7,000	1st	80
12,000	1st	75
16,000	1st	70
7,000	2nd	72
12,000	2nd	68
16,000	2nd	64

(TURN TO PAGE 56, PLEASE)

A NEW ROAD AND FOG LITE BY DIETZ



DIETZ
MARKER LITES

DIETZ Road and Fog Lites are a major safety aid to drivers of trucks, buses and automobiles. They put a powerful beam of light low down on the edge of the road, right where the driver needs it most when rounding unfamiliar curves at night, or in fog.

The new Lite illustrated offers the advantages of sturdy, reliable Dietz construction in a handsome model of black finish, economical for fleet installation. No. 290 is a Road Lite, with clear fluted lens. No. 300 is the Fog Lite, same model with amber fluted lens.

ALSO essential to safe fleet operation are Dietz Marker Lites, made in all approved styles—Dietz Truck Flare Kits, either two or three flares, with or without flags—and Dietz Direction Signals of latest approved designs.

Ask your Supply House about these and other Dietz accessories for Motor Trucks and Buses. If you do not have Dietz' latest Catalog, you will find it a convenience. Send for it.



DIETZ NO. 332 TRUCK FLARE KIT

R. E. DIETZ COMPANY, NEW YORK
Pioneer Makers of Vehicle Lamps, Founded 1840

HEAD LIGHTS • TAIL LIGHTS • MARKER LIGHTS • DITCH, FOG & SPOT LIGHTS • DIRECTION SIGNALS
TRUCK FLARES • REAR VISION MIRRORS • FLOOD LIGHTS • CATAPHOTE REFLECTORS • FIRE EXTINGUISHERS

FOR BIG LOADS . . .
FOR UNMATCHED VALUE . . .
FOR GREATER PROFITS . . .



Light loads, medium loads, heavy loads—whatever your hauling needs may be, there's a GMC to fit and to challenge the field.

Take the medium duty range, for example. For 3 to 5 ton loads, there is an array of GMCs whose popularity is proved by registration figures alone. These big, rugged trucks have, first of all, the advanced streamlined styling that buyers have been quick to value. Powerful valve-in-head engines with their many quality features of design assure the performance and economy that

are reflected in more trips, more work, greater profits. In fact, everything about these modern GMCs "shouts" engineered-for-the-job design and construction.

Then, too, the new all-steel "helmet-top" cabs, available for these and other trucks in the GMC line, match the chassis themselves in features that contribute to advanced styling, comfort, convenience and long life. Words fall far short of doing full justice to the great GMC line. Inspection, comparison and test will prove far more.

GMC
THE TRUCK
OF VALUE

1/2 TO 15 TONS

General Motors Trucks and Trailers

GENERAL MOTORS TRUCK COMPANY • PONTIAC, MICHIGAN

\$425
GMC PRICES START AT
FOR THE 1/2-TON CHASSIS, F.O.B. PONTIAC

Time Payments available
through our own Y.M.A.C. 6% plan

(CONTINUED FROM PAGE 54)

One of the most attractive features in the new trucking tariffs is the frequent provision for "split deliveries" and the picking up of several shipments in a single city to accumulate a truckload. Here the ubiquitous, versatile, and flexible truck is shown at its best. Although trucks previously provided this service, shippers did not always know about it. Even if the trucker had a tariff the shipper was not in the habit of looking at it; he usually preferred to call up and chisel a lower rate. But now that it is in an I.C.C. issue shippers are discovering

it anew, and are not protesting at the five, six, or eight cents per 100 lb. additional it costs. Truckers publishing stop-over services and charges, and re-consignment and diversion rules and charges, are well advised.

A group of truckers serving a furniture center in Virginia has issued an interesting tariff. The first part of the tariff carries rates on furniture from three or four furniture manufacturing cities, all close to one another, to numerous towns nearby and far away. The second part of the tariff publishes rates from these numerous towns to the furniture centers on commodities

that apparently have a steady and substantial movement. Although it is obviously wise for truckers engaged in hauling furniture out of such a region to publish rates back into the center in order to attract return loads, nevertheless it is commendable and intelligent rate making.

AT THE risk of seeming to draw up an unjustified indictment of truck tariffs and their compilers I am going to mention some things that have annoyed and antagonized shippers. One of these is the practice of a few tariff agents charging for their tariffs. Especially when they ask as much as \$12 per copy. I know of shippers who firmly and warmly say "to hell with that," even when they know the tariffs will reveal cheaper rates. The Dayton, Ohio, Chamber of Commerce traffic bureau recommended to shippers that they use only truckers who furnish tariffs free to the bureau. This action followed numerous complaints from industrial concerns of Dayton. Even when well-intentioned truckers send a shipper extracts from their tariffs a poor impression is given. Besides, traffic men want to see the whole tariff and check out their own rates.

As an example of lack of definiteness, rather common with the new tariffs, I recall having seen the phrase "From New York and Vicinity." Who is going to decide what "Vicinity" means? Experts have been wrangling over that very subject for months. I recall another tariff which mentioned all the cities served but you had to guess what States they were in. I'll bet the I.C.C. threw it out. Another trucker described cucumbers as "cukes." One sent an oil company a vegetable tariff on three different occasions, each time in response to a letter inquiring as to his rates.

The most ambitious trucker I ever heard of has a tariff of mileage rates "Between New York, New Jersey, and Pennsylvania, and all points in the United States." Here, in a few words, a trucker is offering a nationwide service. I don't think he has more than four or five trucks. I have tried to figure out the purpose of this tariff, even looking for something devious or terribly clever. But to no avail. Unless there is some good reason for this tariff, however mysterious it may be, I think this carrier ought to keep the publication out of circulation. I know of an office where it caused more amusement than it is good for one to be the object of.

I would be remiss if I did not mention that motor carriers can no doubt profit by observing the progress in tariff simplifications made and to be made (TURN TO PAGE 58, PLEASE)

"Waiting for the Load"



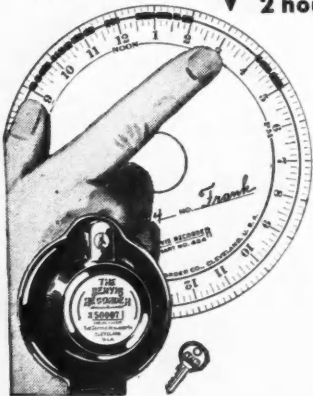
Here's one way to get more work out of your trucks--

REDUCE LOADING TIME

A well known Chicago concern recently put on a dozen *Servis Recorders*. Then they got a big surprise. The Recorders showed that their trucks were standing an average of a little over two hours a day at their own loading platform! Nobody had noticed it much. But when this delay showed up plain as day on a *Servis Recorder* chart they lost no time in reducing this to less than an hour per day, and in that way alone saved over \$5000 a year!

This chart shows up all delays.

Here's a stop of 2 hours!



The Chart Shows It Up

Thousands of trucks are still wasting time in this way because nobody realizes the extent of the waste. Because some of this standing time is unavoidable and therefore legitimate, the tendency is to overlook it altogether, or to "do nothing about it" for a while. But the *Servis Recorder* shows up this waste; also shows all delays en route—as well as overtime, speeding, use of truck at night, etc.

SEND FOR FREE BOOKLET—"Ten Ways of Getting More Work Out of Motor Trucks."

THE SERVICE RECORDER CO.
1422 Euclid Avenue • Cleveland, Ohio

The *Servis* Recorder
Tells Every Move Your Truck Makes

Do Spark Plugs Affect

Gas Mileage ?

The answer is yes. Tests have been made, proofs offered, and stories told but the true story of gas mileage and spark plugs has never been dramatized until the last Indianapolis 500 mile race.

To all operators of large fleets of trucks, buses or motor cars, gas mileage is an all-important item. Operating costs must be kept to a minimum to insure a profitable operation. And, strange as it may seem, spark plugs can be the very reason why operating costs may be high or low.

Let's turn to this well-known laboratory for the automotive industry, for outstanding evidence—the Indianapolis Motor Speedway. On May 30th, 33 racing cars awaited the signal to send them speeding toward a goal 500 miles away. Gasoline was limited to 37½ gallons for the 500 miles, necessitating an average of nearly 14 miles to the gallon. Of the 33 cars that started the 500 mile grind on Decoration Day, 22 were equipped with Champions and of the first 10 cars that finished the race, ALL were equipped with Champions.

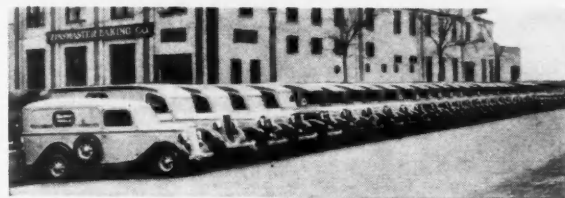
There is a moral to this dramatic story and an answer to that oft-heard question—do spark plugs affect gas mileage? They do, emphatically so, for in the 1936 Indianapolis race, spark plugs were all important. A missing cylinder caused by a leaking, pre-igniting or fouled plug meant loss of speed, waste of precious gasoline. An eloquent testimonial to the economy and depend-

ability of Champion Spark Plugs rests on the fact that the first 10 cars to finish used Champions. And it also establishes the importance of spark plugs in maintaining the best performance, economy and dependability. That is why all spark plugs should be tested, cleaned and replaced at regular intervals to insure peak efficiency.

If you have a particularly vexing spark plug problem, let us route one of our factory trained men in to see you. Constant engineering and research enable us to prove to you that Champion Spark Plugs will meet and beat your problems.



The Georgia Power Company operates 94 buses which travel about 4,500,000 miles annually. Champion Spark Plugs are used exclusively as a result of comparative tests proving Champions give greater gas mileage.



The Zinsmaster Baking Co. who operate over 100 delivery cars in Minneapolis, St. Paul, Duluth and Hibbing, Minnesota, use Champion Spark Plugs for their dependability in sub-zero weather and extreme heat.

Champion

EXTRA-RANGE SPARK PLUGS



Use the
Spark Plugs
Champions
Use

TO KEEP ENGINES YOUNG, TEST, CLEAN AND REPLACE SPARK PLUGS AT REGULAR INTERVALS

COMMERCIAL CAR JOURNAL
JULY, 1936

(CONTINUED FROM PAGE 56)
by the Association of American Railroads' committee appointed for that purpose.

MY FINAL impression is that the truckers have made an auspicious beginning when all the difficult circumstances are recognized. While it has been disappointing to find so close a parallel to railroad rates, it has been just as encouraging to encounter refreshing and useful departures from the rail rate practices. Surely the trend will be toward an independent and self-sufficient rate structure for truck-

ers. Let the railroads follow the leader if they will and can.

If you remember that there are about 27 agents issuing tariffs for truckers, and if you remember that thousands of truckers have issued their own tariffs, then you may be less harsh on the writer when you find herein things with which you do not agree. I know that I have barely scratched the surface of the truck tariff question. More than that could not be done. Instead I have been anxious only to give one industrial traffic man's impressions of the new tariffs, and to make what suggestions seemed worthwhile and

practical. If, under the circumstances, even that much has been accomplished we must be content. Surely you will agree that a tariff at best is a formidable and forbidding document. Multiply it by thousands and you have an idea of the writer's problem—and of the shipper's problem. If you can't pity him, at least you can go easy on him. I have tried to do as much for the tariff compilers.

Safety Depends on the Grub Drivers Grab

(CONTINUED FROM PAGE 21)

"Throw these into the waste basket and let me tell you something."

"THERE must be a million or more truck drivers in the United States," he began. "Some are young, some are middle aged, and some are old. They have different bodily dimensions and proportions. They have different working conditions. They differ from each other in their ability to assimilate, their quickness to react, their imaginations, their emotions and their glandular structures.

"You ask me to give my general idea of safety-first meals for truck drivers. If there were any such thing as an average truck driver, I could prescribe the proper meals for him. But there isn't any average truck driver. Diet is a matter to be determined after study of the individual, and I should have to know his age, height and weight; his physical and mental peculiarities; and his working conditions before I could express any opinion as to what he should eat.

"Where a truck driver eats, and his mental and physical condition when he eats, are more important for safe driving than what he eats."

"Where a man eats is important because the standards of quality, freshness, cleanliness and preparation of foods vary so much in different eating places. Everyone knows spoiled food is unhealthy, and improperly cooked food hard to digest. Fortunately taste and odor are good indicators, and as our mouths sample food we are quick to notice the danger signals.

"WHEN a man should eat ought to be determined by his physical and mental condition because the stomach is a very sensitive and nervous organ. Anger, anxiety and fatigue suppress the flow of gastric juice; make the food hard to digest.

"An angry man should give himself time to cool off before he eats. Strong emotions delay digestion, retard the

(TURN TO PAGE 60, PLEASE)

COMMERCIAL CAR JOURNAL
JULY, 1936

Now!—the most important Power Brake Development in Years



- Positive seal. No leak off. Automatically compensates for pressure fluctuations.
- Permits perfect coordination of tractor and trailer brakes.
- Any brake application automatically maintained until control lever again moved.
- Smoother operation. Prevents grabbing. Saves brake lining and tires.

For Trucks,
Trailers and
Tractors.



Engineered

POWER BRAKES

A GAIN LATHAN-BESLER makes power brake history. Advantages proved in months of testing and thousands of miles of actual road service show "LOCOMOTIVE" CONTROL to be the most important power brake development since LATHAN-BESLER perfected frictionless application. Get the full facts on LATHAN-BESLER'S many exclusive features. Save money with LATHAN-BESLER—no oiling, no greasing, no maintenance. Complete line. Nation-wide sales and service. COMPARE before you buy. Write TODAY for free copy of the big, new 1936 LATHAN-BESLER CATALOG.

LATHAN CO., Inc. SAN FRANCISCO—Polk & Pine Sts. (Since 1911)
DETROIT—477 Selden Avenue



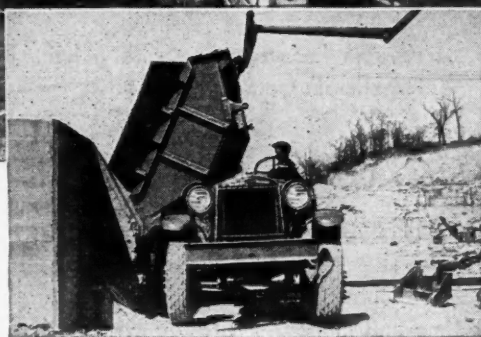
HUGS LAST LONGER

because **HUG
BUILDS TRUCKS
SPECIFICALLY
FOR YOUR
JOB**



● One of a fleet of 3 Model 87Q Hugs with special 6-yard Phoenix type side dumping quarry body receiving its load from the shovel. These trucks were purchased by the East St. Louis Stone Company, East St. Louis, Illinois.

● Lower photograph shows load being dumped by external dumping device.



IN QUARRY and stone product operations the severe abuse and shocking power of solid rock when loaded, plus steep grades with abrupt holes and jagged bumps, calls for an exceptional truck with real guts to take the terrific beating of constant quarry service. Hug quarry models have proven their superiority over ordinary trucks in quarry operations time and time again because Hugs have that *extra stamina built into every part*. From axles to body canopy, from tail gate to bumper, these massive transportation units are designed to meet the most severe conditions encountered in quarrying and stone operations and show a profit even after years and years of service.

Hug offers a complete line of quarry models ranging from 5 to 12 cubic yards



capacity, available with various types of quarry bodies to meet your specific hauling operation.

Tell us about your transportation needs. Let our engineers study your individual requirements and recommend specially designed and built Hug equipment.

Desirable territory open to responsible distributors.

THE HUG COMPANY

598 Cypress Street • Highland, Illinois

BUILT TO MEET A CONDITION



(CONTINUED FROM PAGE 58)
emptying of the stomach, and often cause constipation.

"A worried man should take his mind off his troubles before he eats. Did you ever notice how prone chronic worriers are to indigestion? It isn't what they eat but what they are thinking before, when and after they eat that makes their meals hard to digest.

"A fatigued man should rest before he eats, to give his system a chance to remove the excess of lactic acid from his muscles and prepare his stomach to receive and digest food. Fatigue is usually the body's protest against

monotony, such as, in the case of truck drivers, strained alertness at the wheel, or some discomfort of posture as, for instance, might be caused by an improper seating arrangement.

As to indigestion, a healthy man seldom suffers acute indigestion, and if a truck driver had such an attack he would probably have sense enough to pull off the road and lie down until he felt better. But that 'lump-of-lead-in-the-stomach' feeling, which doesn't cause distress enough to make a man quit driving may be and frequently is the reason why his mind wasn't on his work when the accident happened. Alertness

requires conscious mental focusing which is difficult when a man's digestive apparatus is protesting."

"How about falling asleep at the wheel?" I asked. "Would *what, where or when* a truck driver eats have anything to do with that?"

"It might well have," said the doctor. "During and for quite a while after meals the digestive tract requires an extra supply of blood. Alertness, which is a conscious effort of the mind, causes the brain to increase its demand for blood. But overeating or indigestion may be keeping a driver's blood so busy with his digestive organs that his brain suffers from what might be called 'collateral anemia,' lack of blood, with certain lack of alertness.

"Sleep seems to be the result of fatigue of the higher centers of consciousness—the centers which, when we are alert, respond to stimuli by voluntary reactions such as speech and muscle movements—upon which latter safe driving depends. If, then, a driver is fatigued, digestive difficulties or disorders might easily make him fall asleep at the wheel."

That seemed to be all Dr. Flynn had to say, now let's see what conclusions may be drawn from his comments that are of importance to truck owners and fleet operators.

It would appear that *what and how much* a healthy truck driver eats doesn't make much difference in driving safety, but is determined by how big, healthy, hungry and tired he is. The one exception seems to be that if he is tired to the point of exhaustion he'd better go easy on the food.

Where a truck driver should eat is something over which the fleet operator has little control unless eating places, subject to inspection, are selected—somewhat as the long distance bus lines do it. Doubtless many common and contract carriers use eating places as checking points along their routes, and they might go a step further by checking up on the quality and cleanliness of the food at these places.

When a truck driver should eat—the frequency of meals, and his mental and physical condition when he eats—are matters for fleet operators to consider in various cases. Only actual tests by competent investigators would prove how long a man should drive before he rests and eats.

My personal experience as a truck driver on thousands of miles of long runs, without a single accident, has been that a five-minute rest every hour, a ten-minute rest and a "snack" every three hours, and a half or three-quarter-hour stop for lunch and supper have kept me alert for as many as twenty-four hours of driving.

At last

THE ROBINSON AUTOVAC COUPLER

... a vacuum hose coupling with a built in automatic shut off valve.

Connected ... *Autovac* is fully open!

Disconnected ... *Autovac* is tightly closed!

No valve to turn off ... nothing left to chance. Saves time and money. *Autovac* protects hose lines and mechanism from water and dirt ... it's automatically sealed when not in use.

Autovac's patented locking device in the female coupling is stronger ... it holds the male coupling solidly under any condition.

Autovac couplings form a longer lasting leak proof connection ... the automatic take-up seals tightly long after ordinary couplings fail.

LIST PRICES

Male Unit . . . 3/4" Hose	\$4.50
Male Unit . . . 1/2" Hose	4.50
Female Unit . . . 1/2" Pipe Thread . . .	2.80

●
**RELIABLE MACHINE SCREW CO.,
NEWARK, NEW JERSEY**





Controlled Power

enables the FWD to
'take' the roads as
they come!



OVER-SPEEDING of the FWD Truck is not necessary in order to make better trip time . . . Equal distribution of load and power to the four driving wheels gives the FWD the ability to go into curves, climb hills, travel over slippery roads at high speed with safety because of its balanced traction . . . It takes the roads as they come.

It is no wonder that the FWD, today, sets the standard for safety, efficiency, economy and dependability . . . Faith in the principle of the four-wheel-drive and constant engineering research have produced the truck that delivers the greatest value for the transportation dollar.

The FWD will give you consistently fine performance and economy of operation with the minimum of maintenance.

Send for a copy of the new FWD Safety book.

FWD **THE FOUR WHEEL DRIVE AUTO CO.**
CLINTONVILLE, WISCONSIN
Canadian Factory, KITCHENER, ONTARIO
TRUCKS
1 1/2 TO 15 TONS

5 STEPS TO UNMATCHED TRUCK PERFORMANCE . . .

1. GREATER SAFETY. Front axles are set back, resulting in **power**, as well as load being distributed to all four wheels. This gives the FWD sure footing on slippery pavements, in congested traffic, and when going around curves.

2. GREATER DEPENDABILITY OF SERVICE. Reserve power, rugged construction throughout, and true application of the four-wheel-drive principle, insure continuous operation under any condition. Backed by a nation-wide organization of parts depots and service men available at a moment's notice.

3. FASTER SERVICE. FWDs, with their powerful engines, wide range of gear ratios and four-wheel traction cut down trip time by being able to "make" the hills, curves, and poor going, faster than average trucks. No necessity for over-speeding on the straight stretches.

4. WIDER RANGE OF OPERATION. Four-wheel traction enables the FWD to handle its regular hauling job easily and do the tough jobs as a matter of course.

5. OPERATING ECONOMY. Definite savings are made in gasoline, tire wear, maintenance cost, and other "out-of-pocket" expenses. This is the result of equal distribution of power, load, and scientific four-wheel-drive construction throughout.

CONTROLLED POWER ON AND OFF CONCRETE

It's a Cinch to Read a "Mike"

(CONTINUED FROM PAGE 22)

revolution is .025 in. each, graduation equals one-thousandth (.001) in., the place of reading being at the horizontal line on the barrel or sleeve. Every fifth division on the thimble is labelled 5, 10, 15, 20 as an aid in reading. When 25 of these graduations have passed the horizontal line on the sleeve or barrel the spindle has moved one complete revolution or .025 and the thimble has returned to the zero point at the hori-

zontal line, but the .025 in. has been recorded in the graduations on the sleeve or barrel.

THUS to read micrometers:

1. Note the last figure visible on the barrel or sleeve representing .100 in.
2. Note the number of divisions beyond this figure (there can be at the most three) and multiply by 25.
3. Add the results of steps one and two.
4. Add the number of the division of the scale on the thimble that coincides with the horizontal line on the sleeve or barrel.

5. This sum expressed in thousandths of an inch is the reading.

For example, the procedure for taking the reading in Fig. 2 is to take .200 since 2 is the last figure to the right showing on the sleeve or barrel. Add .025 because there is one vertical graduation on the sleeve or barrel showing beyond the figure. To this sum add .016 because the last figure on the thimble to pass the horizontal line on the barrel or sleeve is 15 and the next graduation which represents .001 exactly coincides with the line. Thus you have:

.200 plus .025 plus .016 which equals .241.

This is the correct reading of the micrometer illustrated in Fig. 2.

TO make a reading of the micrometers in Fig. 3, take .200—as 2 is the last figure showing on the barrel or sleeve—and add $2 \times .025$ or .050, since there are two vertical graduations showing beyond the figure to the right. Zero on the thimble has just passed the horizontal line on the sleeve or barrel and the second graduation coincides with the line, so add .002. Then you have:

.200 in. plus .050 in. plus .002 in. which equals .252 in.

The scale and method of reading inside micrometers is exactly the same as the caliper type, the only difference being the change in shape necessary to take measurements of inside surfaces such as cylinders.

The micrometer is a precision instrument and should be treated as such. In measuring, bring the measuring surfaces slowly up to the work to be calipered. Only a light pressure is required. If brought up too forcefully an incorrect reading will result and perhaps also damage the micrometer. A ratchet is provided at the end of the thimble on some micrometers and when the ratchet slips, the pressure is strong enough for accurate measurement.

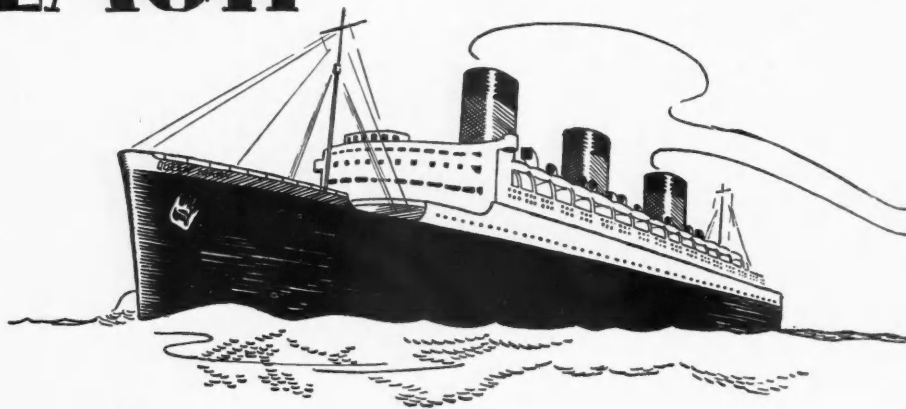
The instrument should be kept clean and placed in a case when not in use. It is well to remember that if the work or the instrument is extremely warm it is impossible to get a correct reading.

Belfone System

BELFONE is an intra-department communicating system recently perfected by Bell Sound Systems, Inc., 6-63, East Goodale Street, Columbus, Ohio. Incorporating certain principles of radio, using an amplifier, microphone and loudspeaker, it permits the transmission of voice from one department to another. With a box, approximately the size of a midget radio, one just flips a key and talks in a normal voice. Amplified and received by a combination of loudspeaker and microphone, the person at the other end distinctly hears and replies. A two-way system costs \$39.50.

COMMERCIAL CAR JOURNAL
JULY, 1936

EACH *in its own way*



The Queen Mary is tops when it comes to jumping the waves.

Unbeatable is the Weatherhead fuel line when it comes to taking vibration.

THE WEATHERHEAD CO.

620-724 Frankfort Ave., Cleveland, O.



AMERICAN BRAKEBLOK
ANNOUNCES REMARKABLE
THICK-BLOCK
DEVELOPMENT

NUMBER

99

A MOST IMPORTANT MAINTENANCE ANNOUNCEMENT

● *AMERICAN BRAKEBLOK, pioneer of the thick-block for heavy-duty braking, now offers a development that will bring exceptional savings to heavy truck and bus operators who adopt it.*

This development (Number 99) retains and amplifies the qualities of safety and economy upon which American Brakeblok's leadership has been built. It establishes entirely new standards of heavy-duty brake lining efficiency.

Far longer life in all installations and under all service conditions is assured. The remarkable durability is all the more notable when it is considered that the stopping values are at the same time vastly improved. In other words, the ideal of truck and bus operators—extreme efficiency combined with maximum wear—has been achieved. Uniformly high friction—the assurance of positive response under continued brake application

and resulting high heats—is present in a degree not heretofore known . . . We will be glad to supply detailed information about this development and its installation on any type of equipment.

AMERICAN BRAKEBLOK CORPORATION, 4600 Merritt Ave., Detroit
A Division of American Brake Shoe and Foundry Co.

**American
 Brakeblok**



THE SAFETY BRAKE LINING

What Floods Did to Fleets

(CONTINUED FROM PAGE 17)

clutches. Although most operators reported that after cleaning clutches, drying out and lubricating throw-out bearings, they experienced no further trouble. One company recommended washing out the clutches of its cars with gasoline. But most operators considered washing out of clutches with gasoline involved too much risk of explosion and fire. In general, minor readjustments restored clutches to satisfactory service.

With very few exceptions (where trucks were needed at once for emergency calls), transmissions were drained, flushed and filled with fresh lubricant, thus avoiding undue wear.

Gallons of water were drained out of the rear axles of the larger trucks. In most cases the lubricants were also drained and replaced. But where trucks were needed immediately only the water was drained out, and the draining stopped as soon as the lubricant began to come out.

Where new cars were caught in the flood, the dealers reported that they completely disassembled the rear axles, replacing any bearings or gears rusted by the water.

Because, of the fibrous grease used in front wheel bearings, most fleet operators found that after they pulled off front wheels in a few cases, the bearings were in good condition. Consequently, where the trucks were urgently needed, the general practice seemed to be not to remove the front wheels.

In the case of new cars and trucks, front assembly and steering gears were disassembled, cleaned and new lubricants put in. In the case of used cars and trucks already in use, general practice was to simply give the various steering gear connections and spindle body bolts a "couple of extra shots" of lubricant, with the idea of forcing out the dirty lubricant.

Where trucks were urgently needed and the wheels not removed, this meant that the brake linings and drums were not cleaned off, and so probably suffered a little more than normal wear. However, brakes are subject to all kinds of road splash and dust—and many operators thought a little flood water might leave the brakes cleaner than usual.

Other fleet operators removed the wheels of all submerged cars and trucks and reported finding enough mud in brake drums and on linings to justify this procedure. Also, when wheels were off, brake linings were

replaced if they seemed to need it.

ON SOME trucks having hydraulic brakes, it was considered advisable to drain and flush the brake reservoir and the hose lines were also cleaned, and filled with fresh brake fluid.

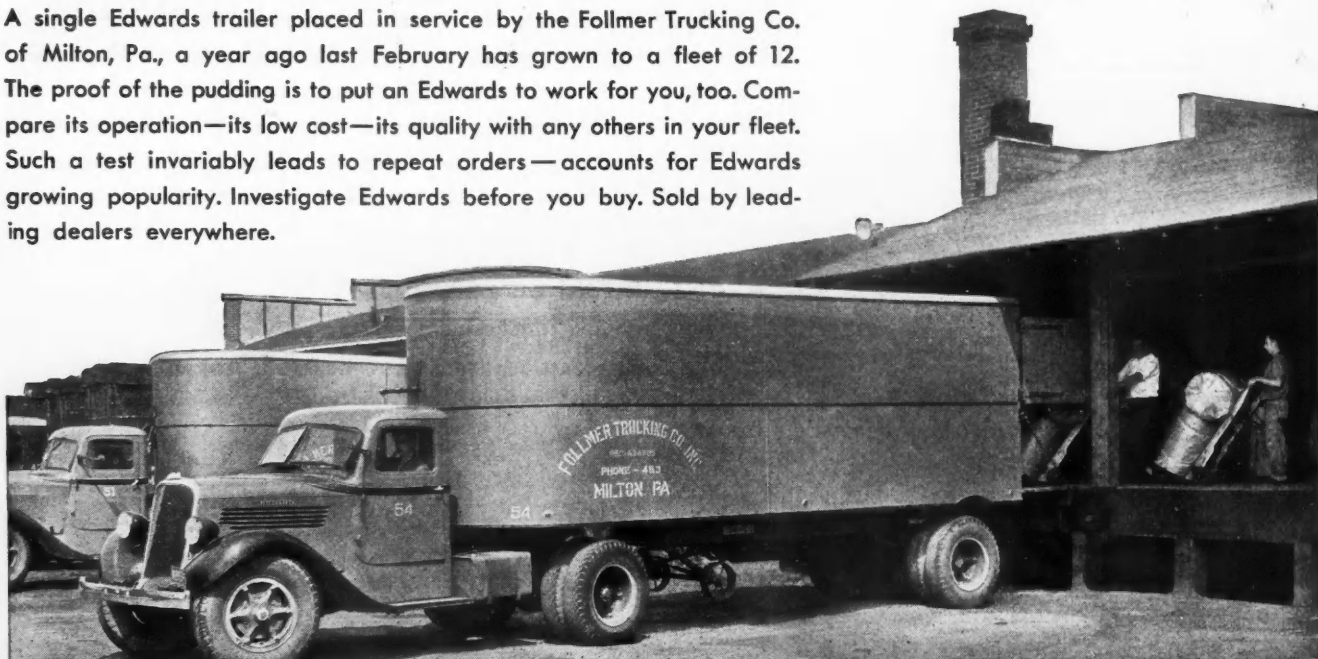
Having had oceans of trouble with so-called waterproof ignition systems on outboard motorboat engines, your scribe was particularly interested in troubles with submerged ignition systems. Fact is, the truck ignition systems did surprisingly well. Many of them were simply cleaned and dried and put right back into service on urgently needed trucks—although some failures subsequently developed during the first week of service. But few failures since then.

Rather than take a chance on roadside ignition failures, those fleet operators who had extra coils and ignition parts available replaced coils, condensers and distributors.

In some cases, high-tension wiring was replaced. But, in most cases, the high-tension wiring gave perfect service when dried off. After all flood water isn't much wetter than the rain water that is often driven onto the high-tension wiring. On trucks having high-tension magnetos, about half of the magnetos subsequently gave trouble—

PROOF OF THE PUDDING

A single Edwards trailer placed in service by the Follmer Trucking Co. of Milton, Pa., a year ago last February has grown to a fleet of 12. The proof of the pudding is to put an Edwards to work for you, too. Compare its operation—its low cost—its quality with any others in your fleet. Such a test invariably leads to repeat orders—accounts for Edwards growing popularity. Investigate Edwards before you buy. Sold by leading dealers everywhere.



EDWARDS

EDWARDS IRON WORKS, INC., SOUTH BEND, INDIANA

QUALITY SEMI-TRAILERS

usually in armatures and condensers. Quite a few ignition coils had to be replaced.

BATTERIES were generally but little affected by immersion for from one to three days. Where trucks were needed at once, batteries were usually replaced, so as to be sure of a freshly charged battery for emergency work. But most operators found that the air vents in the batteries were so small that the water, trying to get in, met air trying to get out, and so no water got in. Other operators siphoned off the solution to the level of the tops of the plates and replaced with fresh battery solution.

Fuel tanks were invariably drained and, in some cases, dried by blowing out with air. Where there was plenty of time, fuel lines were blown out and filters, fuel pumps and carburetors cleaned. Where time was important, fuel pumps and carburetors were exchanged—to eliminate possibility of roadside troubles.

Except on rush jobs, cooling systems were usually drained and flushed, and the tubes and fins of the radiators washed off with a hose.

Where new cars were submerged, upholstery fabrics and padding had to be completely removed and replaced. This accounted for by far the greater part of the expense of reconditioning flooded new cars. Where cars were traded-in on the purchase of new cars, the upholstery was scrubbed and treated with disinfectant.

Trucks finished with artificial leather had this washed, dried and disinfected. In fact, entire trucks were disinfected by spraying to kill any disease germs washed down by flood.

Because most truck bodies had metal panels or combined wood and metal, but little damage was done to body panels. The heavier floor boards of many trucks were badly warped, and had to be replaced. All-steel bodies gave no trouble with warping.

MAJOR equipment carried on trucks, such as winches and hoists, suffered but little damage. But such minor equipment as first-aid outfits, ropes, gloves and overalls were not worth salvaging.

Service mechanics showed a fine willingness to cooperate. Some of the mechanics worked more than 30 consecutive hours with flashlights, in cold, wet garages to get needed trucks into action. In fact, at one garage, the mechanics had the trucks ready to run before the telegraph poles, washed from the storage yard against the garage doors, could be removed.

New passenger cars, in the \$5000

class, were returned to Detroit factories for complete rebuilding. New cars, in \$1200 class, were put on trucks and returned by small town dealers to factory branches in Pittsburgh for reupholstering, disassembly of working parts and replacement of electrical units.

Grip-Lock Bearing

THE SKF grip-lock bearing is the latest addition to the SKF line of anti-friction bearings. Essentially, the bearing is the

conventional, self-aligning extended inner race bearing with an eccentric groove machined in the bore of the inner race. Fitted in the eccentric groove is a piece of spring steel known as the grip-lock shoe. When the shoe is in the deepest part of the eccentric groove the bearing may be readily slipped on the shaft. Then, by holding the inner race of the bearing while the shaft turns in the direction of operation, the knurling at the ends of the grip-lock shoe grips the shaft causing the shoe to wedge in the shallow part of the eccentric groove, thus securely locking the bearing on the shaft.



COULD A CHAMP BREAK PAR WITH A SLEDGE-HAMMER?

You'd say "no," and you'd be right because the unwieldy dead weight of a sledge-hammer would be much of a handicap rather than a help. But a truck or trailer loaded with dead body weight is no more ridiculous or unnecessary than a golfer playing with a sledge-hammer.

On your next truck or trailer specifications insist on Plymetl. It eliminates dead weight, makes flatter, smoother and stronger bodies and it's much stiffer than steel of the same weight.

Plymetl requires no inside braces or supports to give it needed rigidity and strength, and it permits heavier pay-loads which is extra profit.

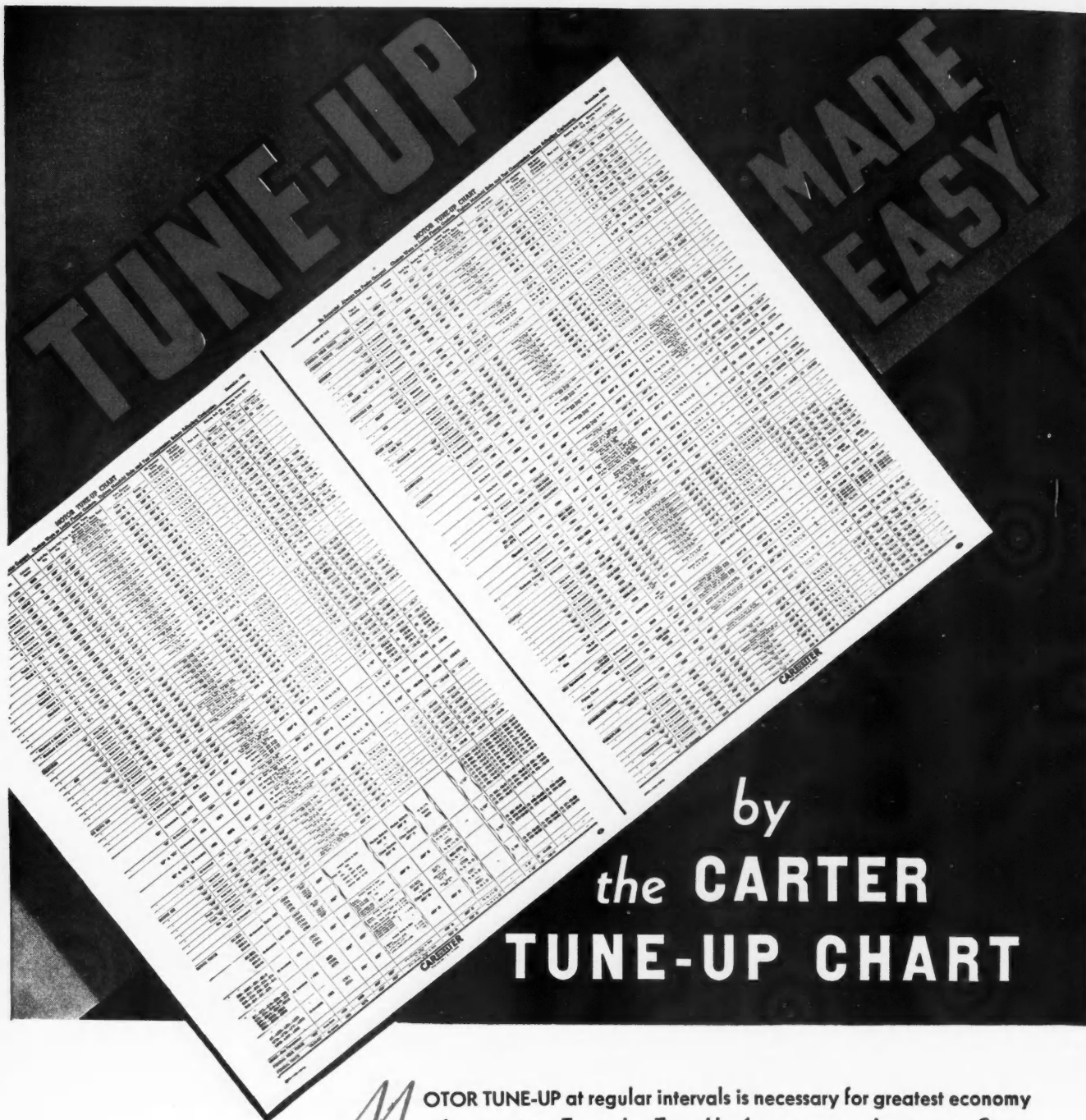
Plymetl is extremely light, yet extra strong and exceedingly durable.

SHOWN BELOW, THE
STUTZ PAK-AGE-CAR
FOR FREQUENT STOP
DELIVERIES—PLYMETL
BODY



HASKELITE MANUFACTURING CORPORATION

208 WEST WASHINGTON STREET, CHICAGO, ILLINOIS



by
the **CARTER**
TUNE-UP CHART

*M*OTOR TUNE-UP at regular intervals is necessary for greatest economy of operation. To make Tune-Up fast, easy and accurate Carter has prepared a special wall chart covering all models of Carter-equipped cars and trucks.

Upon request we will send you a copy of the Carter Motor Tune-Up Chart and complete instructions for servicing the Carter carburetors you are using. Be sure to tell us the makes and models of the cars in your fleet.

CARTER CARBURETOR CORPORATION

2834 - 56 North Spring Avenue

St. Louis, Missouri

CARBURETER



Division of AMERICAN CAR AND FOUNDRY COMPANY

COMMERCIAL CAR JOURNAL
JULY, 1936

Another **SPECIALLY
STYLED**



MASTERCRAFT TRUCK BODY

Heavily insulated type Truck Body for safe delivery of Meats, Food Products and Provisions. Ceiling, walls, floor and doors are protected by high efficiency insulating material. Interior lined with galvanized steel. Any desired method of refrigeration can be installed and in capacities for all standard chassis.

LUCE MANUFACTURING CO.
Lansing, Michigan

Money Makers — Continued

93E Can you name all of THOMPSON PRODUCTS—They're all listed on page 93. Read about them and then get more information from us via the post card.

93F For just a little more you can own a HALL ECCENTRIC VALVE SEAT GRINDER which is identical in principle and precision with the production grinders in use by Plymouth and 35 others. Read the ad and then check the post card and mail it to us for more information. See page 93.

94A The world's largest operators of commercial vehicles use JONES PORTABLE TACHOMETERS to check engine speeds, for tune-ups, and for seating governors. A recommendation like that means you ought to know more about them. Read the ad on page 94, then get more information from us via the post card.

94B Follow the leaders, for they know the way—and read the ad on AUTOCAR TRUCKS on page 94. You can follow the leaders, too, in getting complete information, for they know the way is to mail us the post card.

94C Can GOODRICH SILVERTOWNS take it? We'll say they can—on page 94. Read the ad and then send the post card to us for all the details.

94D GRAMM TRUCKS AND TRAILERS have an important message on page 94. Read the ad and get more information from us by checking the post card and mailing it to us.

94E "DAG" BRAND COLLOIDAL GRAPHITE is a good auxiliary lubricant to use when running in new or rebuilt engines. After you read the ad on page 94 we'll get more information for you if you properly check the post card and mail it to us.

94F Important money—which is pretty important—is being saved fleet operators through the use of PUROLATOR OIL FILTERS. We'd want to know about that if we operated a fleet, and we're sure you will. Learn more, via the post card. See page 94.

94G Any time you want, the BLACKHAWK MFG. CO. will give you a BLACKHAWK JACK—a lot of jack—for a little jack. Read about their new offer on page 94, then learn the details from us via the post card.

94H DITZLER AUTOMOTIVE FINISHES — PYROXYLIN LACQUERS—SYNTHETIC ENAMELS—have been standard in the automobile industry since 1902. Read about them in the ad on page 94, then write to us for the information you will certainly want.

94I On page 94, the McCORD RADIATOR AND MANUFACTURING COMPANY tells you about their McCORD REFRIGERATION FUEL SYSTEM FOR TRUCKS. You can get all the details by reading the ad, and writing to us via the post card.

94J Four-wheel drive increases traction in tough going and provides extra power under all conditions. OSHKOSH 4-WHEEL DRIVE TRUCKS are the goods—clear through. Ad on page 94. Check post card for all particulars.

95A For safety's sake, equip your trucks with BERG'S POWER BRAKES WITH REACTIONARY CONTROL. The price (which you will find in the ad on page 95) is so low you will be amazed. Write us for any further information you require.

95B BLACK DIAMOND SEAT CUSHIONS (a product of KARPEX MFG. CO.) make friends by holding them. That sounds funny, perhaps, but it's all explained on page 95. We'll get you the details if you send us the post card.

95C You'd better prepare now for safe fall and winter driving by reading the ad of LINTERN CORPORATION on page 95. We'll get you the LINTERN-SANDER booklet if you mail us the post card.

95D BURCH DUMP BODIES with Balanced Power Hoists—there's a lot you ought to know about them printed on page 95. We can get complete details for you if you check the post card and mail it to us.

95E There are speed washing surprises for you in the ROTAWASHER ad on page 95. Read the ad and then ask us for as much information as you require via the post card.

95F DEARBORN LINE CAB-OVER-ENGINE for Ford Trucks still goes on increasing the profits of many Ford owners. Read about it on page 95, and then send the post card to us for the details.

96A You can't ask more of a customer than another order. And that is the proof of the performance of STERLING DIESEL MOTOR TRUCKS. Read the ad on page 96, and then write to us, via the post card, for all the details.

96B HOOFF GOVERNORS are used exclusively on hundreds of national fleets. You can learn something about them by reading the ad on page 96, filling out the post card and mailing it to us for complete details.

96C HANDY is the world's largest manufacturer of GOVERNORS — AIR CLEANERS — OIL FILTERS—OIL CONDITIONERS. You can't afford to miss the ad on page 96; and you can't afford to pass up the information we can get for you if you mail us the post card.

96D SIMMONS SILVER KING HYDRAULIC JACKS are a buy for any lifting need. That's why you'll want to read the ad on page 96. We can get their catalog for you if you properly check the post card and mail it to us.

96E Want to convert your Ford or Chevrolet Truck into a RUGGED, POWERFUL 4-WHEEL DRIVE? See Alma Mfg. Co., page 96. Check post card for details.

96F AHLBERG BEARING CO. has a much more important offering than page 96 might claim. Check post card for particulars.

96G NOC-OUT HOSE CLAMPS are the standard equipment of the automobile industry. Read about them on page 96, then get complete information from us via the post card.

96H WONDERWELD seals cracked engine blocks in 30 minutes without teardown! Seals with genuine high-grade metal—permanently! That's the biggest money-saver ever. There's an ad telling you about it on page 96. And you can get complete information from us if you send us the post card.

97A A constant stream of new, clean oil—refinery pure! That's why BRIGGS MODEL 1000 OIL CLARIFIER cuts maintenance! And that's the biggest money-saver ever. There's an ad telling you about it on page 97. And you can get complete information from us if you send us the post card.

97B Strength, power and speed! That's what you get in PERFECTION BODIES for heavy duty. PERFECTION COAL BODIES are no exception! There's an ad about them on page 97. Read it, and then ask us for complete details via the post card.

97C Two safety aids every truck needs—of course they are manufactured by the K-D LAMP CO.—are described for you on page 97. Read the ad and then check the post card and mail it to us for more information.

98A CORDS PISTON RINGS last longer, and will not wear cylinder walls! Learn all about them on page 98, then check the post card and mail it to us for complete information.

98B Is there anybody present who would like to haul dollars to the bank? ACME SIX WHEELER COMPANY tells you how to do it on page 98. After you read the ad we can get you more information if you mail the post card to us.

98C Sell LITTLE GIANT FRAME EXTENSIONS! There's a market for them right under your nose! Good business for you if you go after it! Read about the proposition on page 98, then write us for more information.

98D The first real lamp improvement in 20 years! It gives safety from every angle! DO-RAY LAMP CO. announces it on page 98, where they describe their NU-RAY LINE of STOP AND TAIL LIGHTS. Read the ad, then ask us for more information by way of the post card.

99A KINGHAM SEMI-TRAILERS are increasing in popularity all the time. You'd better learn about them by reading the ad on page 99, checking the post card and mailing it to us.

99B Six cents' worth of SANI-FLUSH will prevent clogged radiators. Read how and why on page 99, and then mail the post card to us for more information.

99C Don't resurface that cylinder head! Put on an ALUPAK GASKET! Don't skip this! Read the ad on page 99! Then write to us for more information.

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Effects of Legislation On Truck Design

(CONTINUED FROM PAGE 33)

base. Steering is not adversely affected in a properly engineered design. In the case of the heavier sizes it was believed that power steering might be required but experience has shown that even with the largest balloon tires and front-end loading in excess of 9000 lb., no difficulties on account of hard steering are experienced.

Ingress and egress equal to conventional models has so far not been procured. Engineers directly concerned with the design of camel-backs feel that improvements in the design of cabs will make this point of small moment.

DRIVER visibility is definitely improved, this factor contributing both to safer and more efficient operation. The construction places the driver approximately 3 ft. closer to the front of the vehicle, giving him a better view at street intersections; and because the cab is wider and the driver sits closer to the center of the road it provides him with better rear vision. The driver's eye-strain is lessened by the absence of the long glaring hood.

The effect of camel-back construction on the riding qualities is a much disputed question. Operators tell me that it is easier riding, although they admit that there is a difference among makes. Engineers with practical experience in camel-back design admit that riding qualities are changed because it becomes necessary to get easy riding with heavier springs with the driver not so advantageously located. However, they declare that satisfactory riding qualities can be accomplished.

The effect of camel-back construction upon the accessibility of the powerplant, powerplant accessories, clutch and transmission varies with the different designs. The experience of operators indicates that accessibility is not as good as on conventional trucks, although there are instances where today's conventional truck is not as accessible as it was several years ago. So much progress has been made in simplifying the approach to preventive maintenance and to repairs that in a number of designs a comparison between the new and old models proves conclusively that designers have recognized accessibility as the cause of a major prejudice among operators and have taken steps to wipe it out. Enough progress has been made to indicate that operators will have no cause for dissatisfaction.

The short wheelbase of the camel-back chassis is naturally very attractive in tractor-semi-trailer operation. Its

use as a tractor has occasioned operating difficulties but these, I understand, were due to improper analysis of problems. The camel-back tractor provides a saving in space from front bumper to king pin that approximates 36 in. In the camel-back it is possible to mount the fifth-wheel a greater distance ahead of the rear axle, but widely held opinion questions the desirability of this practice. The farther ahead the fifth wheel, the greater the overhang on the semi ahead of the landing gear, and the greater this overhang the greater the tendency for a loaded semi to nose-dive when disconnected from the tractor. Also, when the fifth wheel is located too far ahead of the rear axle, a tendency to "snake" the train exists. The conventional mounting is from 4 in. to 8 in., with 6 in. very common. A mounting 15 in. ahead is not uncommon in cases where the tractor and semi are never disconnected.

B—Semi Trailers; C—Trailers

THE overall length restrictions on truck and full trailer combinations, which are 50 ft. and under in the majority of states, have presented a design problem. The camel-back is being successfully applied. In addition the necessity of meeting the restrictions has resulted in efforts to shorten the distance between the front of the full trailer and the rear of the truck. They have been accompanied by some degree of success. The practicable minimum distance appears to be approximately 48 in. for square cornered bodies, and 36 in. for rounded corners. Spacings as low as 24 in. and 18 in. are in use but turning and maneuvering are restricted.

Width Limitations

WIDTH limitations represent the nearest approach to uniformity of any of the truck restrictions. Forty-four states and the District of Columbia stipulate an overall width of 96 in. Two states exceed this limit and two fall below it, although one of these grants 96 in. to for-hire vehicles.

Height Limitations

LEGISLATIVE restrictions on height have had no harmful effect on automotive development. Bridge clearances rather than politics have been the influencing factors and all states with the exception of three have a limit of 12 ft. or better. The industry and practically all groups that have expressed themselves on the subject, favor a uniform limit of 12 ft. 6 in. There are only 12 states at present that fall below this figure, nine with a 12-ft. maximum, two with 11½ and one with 11.

WEIGHT LIMITATIONS

A—Gross Weight

CONTRADICTORY and in many cases arbitrary weight restrictions have unquestionably deflected the normal development of motor transport. Flat limitations of gross weight are in force in 35 states, seven of which make no allowance for multi-axes. Of 41 states which allow multi-axes, regardless of basis, 17 favor the tractor-semi-trailer, as against the six-wheeler; one grants the six-wheeler more load than the tractor-semi-trailer; and 15 make no allowance whatever for the six-wheel truck over and above the maximum limit prescribed for four-wheelers.

It is obvious that were the sizes of highway transport vehicles to be determined purely upon the economics of transport, the average size of vehicles would be considerably greater than at present. This does not mean that the maximum size of vehicles would be any greater, nor does it mean that there would be a smaller number of the very small commercial cars. It simply means that, between these extremes, there would be more vehicles of large capacity and a smaller total number of vehicles of all capacities. Stringent weight limitations have encouraged many undesirable developments and practices as will be enumerated further on. Even in those territories where more liberal restrictions permit the use of larger vehicles their adoption has been discouraged by the restrictions imposed by neighboring states through which frequent or occasional operation is contemplated, and by the constant threat of further restrictions. Users hesitate to invest in such vehicles for fear their operation will be prohibited at a later date.

THE effects of weight limitations are varied.

The extent to which gross weight legislation on tractor-semi-trailer units has discriminated against six-wheel units is difficult to evaluate. There is no doubt that some of the legislation gives the tractor-semi a greater gross weight advantage than perhaps is deserved on a strictly engineering basis. But the discrimination, such as exists, is due less to political skullduggery than to neglect for want of champions. The semi-trailer, presenting less difficult technical problems, developed early and acquired a considerable following while six-wheeler sympathizers were still fighting the bloodless but seemingly endless battle of the inter-axle differential; and while operators were having their headaches with some of the early, haphazardly engineered third-axle attachments. So while the

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(CONTINUED FROM PAGE 88)

semi-trailer was being championed in legislative revisions, the six-wheeler was simply overlooked. If the case of the six-wheeler is ever presented forcefully to legislators, as it should be, I believe many of the gross weights will be made to compare more favorably with those enjoyed by the tractor-semi. Legislation recognizing the merits of the six-wheeler would not necessarily affect the phenomenal growth of semi-trailers. The lower investment, the lower operating cost per ton-mile in many operations are practical considerations which users will never overlook.

There is no doubt also that repressive gross weight limitations have operated as compulsory overload laws. Many large operators are forced to compromise on chassis weight to obtain satisfactory payloads. Many small operators are buying light trucks and overloading them to limits that jeopardize their safe operation and reduce their speed on grades to an extent that becomes a nuisance to traffic. It is a condition for which legislators are largely responsible, and which they will doubtless seek to correct not by furnishing relief from restrictions but by imposing additional restrictions.

TO counteract severe gross weight restrictions it is only natural that the operator should seek to have as much of this weight in payload as possible. The lighter the vehicle the greater its attraction, at an obvious sacrifice of power and ruggedness for it is not designed to handle efficiently the tasks that he intends to impose. The result is a further sacrifice of speed and ability, and complaints on this score by the motoring public—all because the weight restrictions work directly opposite to the public desire for more mobile truck trains. The fact that these operators seem willing to replace the lighter units after 50,000 to 75,000 miles when vehicles designed to perform the work far more efficiently will easily do 200,000 miles, merely compli-

cates the issue. It is a certainty that in time there will be a public demand for relief, and as previously expressed, it is to be feared that relief will come not in the form of correcting arbitrary weight legislation but in imposing additional restrictions.

B—Axle Weight Limitations

ALTHOUGH authorities have been in agreement for years that the concentration of weight on a single axle was the measure of the effect of vehicular traffic on the road rather than the gross weight distributed among several axles, only 38 states have axle weight limitations, and of these all but three impose maximum gross weight limitations in addition.

The industry generally is of the opinion that axle weight limitations are desirable and that they have had a favorable effect on truck development. They stimulated the development of the camel-back type, the set-back axle type, longer wheelbases of conventional units with given body lengths in order to approximate the load distribution of the camel-back, and the use of dual tires on the front as well as on the rear of full trailers. It is felt that in the presence of gross weight restrictions as well, the benefits have been definitely curtailed, particularly those accruing in the case of six-wheelers.

The six-wheeler certainly would enjoy a greater amount of development if there were no weight limitations other than on the axles. More axles would mean more gross, and in turn more payload and profit. It would also mean the end of the dummy or ornamental species of third axle attachment which seems to meet the requirements of some states in which a six-wheeler is loosely defined.

C—The Bridge Formula

THE so-called "bridge" formula for determination of gross weight is an-

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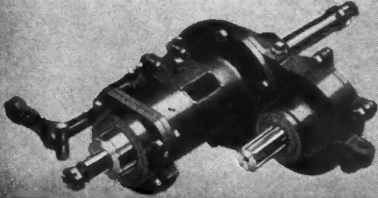
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(CONTINUED FROM PAGE 90)

other source of speculation. In one interpretation or another eight states prescribe it as the sole arbiter of gross vehicle weight, while 12 states in all prescribe this formula as a part of their limitation.

The probable effect that universal use of this formula, in lieu of all other weight restrictions, would have upon motor vehicle design arouses conflicting speculations among engineers. Under the lash of competitive demands by users extremely large heavy-duty vehicles would have been developed, according to one group of engineers, who foresaw the roads clogged with all kinds of freak designs which would have inspired much of the restrictive legislation we now have.

The optimistic section holds that the bridge formula in lieu of all other restrictions except the retaining of the 96-in. overall width, would stimulate the development of the most practical designs for motor transport use. The tractor-semi and six-wheeler would have very nearly equal limitations. The former would have a slight advantage due to the greater spread of axles, but the latter would be permitted nearly the maximum recommended for tires applicable to such a unit holding the 96-in. overall width. This difference in permitted overall gross weight would be offset by the advantage the six-wheeler has in slightly lower chassis weight. The law would permit the building of units strong enough to be safe and powerful enough to move loads at speeds more comparable to that of average pleasure-car traffic. It is conceded that it might have the disadvantage of stimulating the use of units longer than now considered necessary, and that a sensible limitation on overall length might be desirable.

D—Chassis Weight as a Determinant of Gross Vehicle Weight

THE worst legislation on the statute books is that which definitely stifles design progress. Such legislation is in effect in Maryland, Pennsylvania and California and there are indications that other states are flirting with the idea of following suit. The legislation specifically is that which determines the permissible gross vehicle weight on the basis of net chassis weight, or, as in the case of California, upon the total unladen weight, which would include the body.

This legislation applies a severe curb to development because weight savings due to superior construction and materials are penalized. It penalizes engineering effort in the development of powerplants with a greater horsepower to weight ratio. It discourages the use

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COMMERCIAL CAR JOURNAL
JULY, 1936

of lighter and stronger steels and the use of lighter alloys.

It places a premium on pig-iron engineering. It encourages the artificial ballasting of chassis to procure gross weight licenses for which the chassis were not designed. Thus the unscrupulous purveyor and operator are encouraged to promote highway hazards by placing vehicles on the roads that are dangerously overloaded.

It encourages, when tied up with registration fees as in Pennsylvania, evasion to the limit of enforcement by suggesting to operators the purchase of chassis one or more sizes too small for the loads which they actually carry.

In short, it is absurd legislation in that it automatically grants a greater load capacity to a chassis if larger and heavier powerplant, transmission, etc., are used whereas such additional non-structural weight should reduce the net load capacity. And it is vicious legislation in that it ignores the proper goal of truck engineering, which is to produce chassis with the least weight and the greatest strength.

PERFORMANCE REQUIREMENTS

IN the truck industry existing legislation seems to have the cumulative effect of stimulating more and more legislation because certain restrictions lead to subterfuges, evasions, malpractices and nuisances which in turn call for additional restrictive legislation. This is true of the growing demand for performance requirements. Restrictions, as pointed out, have littered the highways with vehicles laden beyond their capacity for efficient operation which are transformed into snails when forced to climb grades. This has led to a recommendation by the National Conference on Street and Highway Safety that highway transport vehicles be capable of a minimum speed of 20 miles per hour on 3 per cent grades in flat country, and 20 miles per hour on 6 per cent grades in hilly country.

Conditions seem to call for some sort of correction. Most manufacturers and certainly the majority of large operators favor a reasonable performance requirement. However, the Street and Highway Safety Conference's recommendation does not meet the industry's definition of reasonableness. The 6 per cent grade ability would result in a ridiculously high horsepower requirement. Six per cent at 20 m.p.h. in Pennsylvania, New York, Ohio, Michigan, Illinois, etc., would mean 230 to 260 or more horsepower at the tires to handle present legal gross weights. Vehicles so powered would be too expensive to operate over normal routes.

(TURN TO NEXT PAGE, PLEASE)

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These stringent recommendations would have a marked effect on tractor-semi-trailer and six-wheeler design and operation. Larger engines would have to be used to provide the necessary torque, which in turn would require correspondingly heavier clutches, transmissions, propeller shafts, rear axles, etc. Abnormalities in design would doubtless be attempted, such as extremely large engines in light vehicles but the effects on the unrelated power transmitting units would have a discouraging economic effect.

THE alternative would be a reduction in payloads but the net of it all would be increased costs, and would compel higher rates among for-hire carriers. The large operator would find standardization impractical and availability of vehicles for transfer from one section of the country to another unsound.

There is more reasonableness in the performance recommendations proposed and submitted this past winter by the sub-committee of the Automobile Manufacturers' Association to the U. S. Bureau of Public Roads, the Federal Coordinator of Transportation and the Safety Bureau of the Interstate Commerce Commission. This recommendation was to the effect that "every motor vehicle, or combination of vehicles, fully loaded, must be capable of climbing a 4 per cent grade at a speed of not less than 20 miles per hour." Nothing was said of flat country or of hilly country. It is a matter of common sense that if a truck can climb a 4 per cent grade in hilly country at 20 m.p.h. it can do the same in flat country. Furthermore, this recommendation applies the requirement uniformly throughout the country to avoid the confusion that would attend the determination of flat and hilly areas.

Doubtless, had it not been for unreasonably oppressive legislation of other types, the situation with respect to inadequately-powered vehicles obstructing the free flow of traffic would not have been as serious as it is today. But since the chiselling buyer and the chiselling maker, like the poor, will always be with us, a performance requirement law may have the beneficial effects of outlawing under-buying and over-selling of equipment and winning for highway transportation the good will of the motoring public. The regulatory power granted the Interstate Commerce Commission over for-hire operations and, in the matter of safety, over private trucks, offers a ray of hope for uniform requirements of a reasonable nature which will encourage individual states to follow the leadership of an agency that is motivated by public interest.

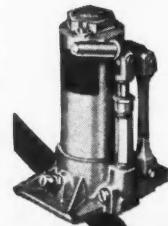
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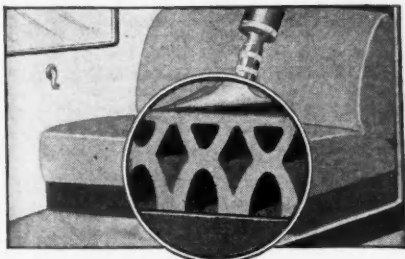
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JULY, 1936

Brake Requirements

There is also a growing tendency to increase the severity of braking requirements. It is entirely reasonable that trucks which travel on the same roads with passenger cars, and in many cases at comparable speeds with much heavier loads, should be expected to be able to stop in the same distance as a modern passenger car. Otherwise, the truck would constitute a menace. In the achievement of this desirable end service brake requirements impose no hardships on truck design.

However, the tendency to demand emergency qualities of the hand brake by the imposition of minimum stopping distances cannot be considered a normal and constructive development. In the days of the two-wheel manual brake an adequate hand brake was indispensable to safety. But modern, four and six-wheel power-actuated brakes require no secondary auxiliary, and the hand brake has in fact become a parking brake only, as it is universally on passenger cars. Today tremendous power is used in the application of vehicle brakes, and the hand brake cannot be expected to anywhere near equal the service brakes, nor to possess real emergency value unless operated by an entirely separate power brake system, equipped with an entirely separate vacuum reserve tank. And that would be a ridiculously extravagant objective.

Conclusion

MANY restrictions have had bad effects, but it is well known that the industry does not view with disfavor all motor truck legislation. In the midst of much that is ill-advised, discriminatory or down-right oppressive there is some that is good. The industry favors the stabilizing effect of reasonable legislation. There is a distinct feeling that an absence of legislation would result in vehicular monstrosities dictated by avid operators which eventually would inspire the curbing influence of legislation. From the industry's

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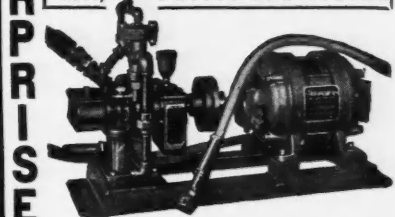
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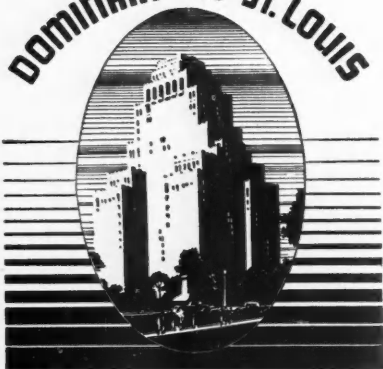
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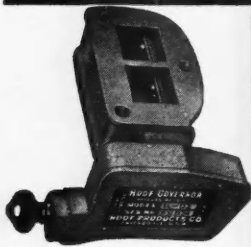


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standpoint, the most desirable thing is uniformity of legislation. The engineer can always design to meet a particular circumstance, but his headaches begin and the costs multiply when he has to design to meet a half-dozen different sets of circumstances imposed by as many states.

The result is a tremendous economic waste, particularly in interstate operation because the minimum conditions imposed by one state virtually become the conditions under which transport must operate in other states.

Uniform legislation with regard to sizes and weights would allow engineers to so concentrate their skill that unquestionably the result would be better design than we have today, design meeting the highest standards of safety and mobility.

However, while we are waiting for the millennium the efforts of our designers should be directed at realization of the logical trend of design, the motor transport ideal, which is truck chassis design that is confined to the least possible space consistent with the load to be carried.

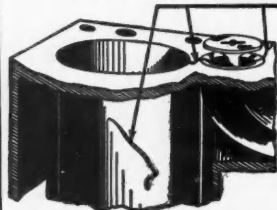
Reo Consolidates Operations

Reo Motor Car Co., Lansing, Mich., is consolidating its truck manufacturing operations in its main plant. Moving operations now under way will be completed within 90 days. The former truck plant will be used for storage purposes.

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THE new Eveready prestone tester, with float scale and protection table, has been designed to give motor vehicle operators the greatest possible degree of accuracy and readability. It is constructed to test only one anti-freeze—Eveready prestone—making it impossible to read the wrong float scale or protection chart. All rubber parts are colored green for quick identification. It has an all-glass float and an extra long nozzle. The Eveready prestone tester is being offered free to those ordering 24 gal. or more of Eveready prestone for delivery before Oct. 15.

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